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ABSTRACT

The features of an organization are examined in order to understand it and the way it affects information flow. The basic premise is that a typical organization fosters two opposing conditions--condition of stability and orderliness in order to protect its functioning and internal relationships; and a condition stimulating creativity and innovation in order to keep up with the myriad of changes that affect it. Furthermore, knowledge and information flow can be on the one hand inhibited by organizational features that preserve the status quo and, on the other hand, facilitated by the methods that encourage innovation. The flow of communication into an organization may be impeded by different status levels and coding schemes between organizations and rigid social relationships, lack of openness to outsiders, local pride, anticipatory personal threat, poor training strategy, and the organization's economic situation. Knowledge input may be improved by appeal to profit, chief administrator changes, administrative decree, crisis perception, examination of organizations, good training techniques, usage of external agent, invasion from outside, knowledge seeking subunits, and enhanced professionalism. Information transmission out of the organization depends upon its goals. (Author/DM)

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THE IMPACT OF THE CHARACTERISTICS OF THE ORGANIZATION ON INFORMATION FLOW

by
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We are affected by organizations from birth. They are a significant part of our lives. Organizations occupy many of our waking hours and for good reason: they help sustain us by giving us an orderly and efficient way of attaining most of our goals and satisfying most of our needs.

Organizations then are ubiquitous and, as such, an understanding of them and their impact is important for the general comprehension of information or knowledge flow. It is the purpose of this paper to review the "chemistry" of the organization and relate the impact of the elements of the organization to information flow.

The relevance of knowledge flow to organizations is great: indeed, organizations have been defined as *complex information processors*. With this in mind the paper will explain: 1) what constitutes the "complexity" and 2) what factors affect "information processing" or as we shall also refer to it, *knowledge flow*. The overall plan of this paper is as follows.

In Part I we will offer some basic distinctions pertinent to the understanding of the organization itself as well as to knowledge flow in the organization. The discussion will be divided into four sections as follows:

A. Levels of organizational analysis and the importance of knowledge flow
B. The flow in, through, and out of the organization
C. Directions of knowledge flow, and
D. Meaning of membership in organizations.

In Part II the major features of the typical organization will be discussed. The two basic needs of every organization, *orderlines* or *stability* and *innovation* are introduced, and from these two themes an enumeration of characteristics of the organization follows. Each of these characteristics is potentially both an inhibitor and facilitator of information flow.

In Part III specific organizational barriers to knowledge flow are discussed in detail. These barriers, manifestations of organization characteristics, are analyzed in terms of their effects on flow into, through, and out of the organization.

Part IV deals with the means available to organizations for overcoming barriers to the flow of information. Again, the "in, through, and out" distinctions are used, this time to explore the specific mechanisms which may be used to facilitate knowledge flow. This last section should be of special interest to the agent of change who works in an organizational setting.

Finally, a brief summary of the contents concludes the paper.

PART I

SOME BASIC DISTINCTIONS

In this section we will cover a number of areas which pertain to organizations and the flow of knowledge. The purpose is to elucidate some of the central concepts and dimensions of this paper. At first we will take a brief look at three levels of organizational analysis and the importance of knowledge flow. Next the general conceptual scheme will be introduced and related to the material of this paper. The third set of distinctions will look at the patterns and directions of knowledge flow which are basically categorized as vertical or horizontal. Lastly, we will examine the social and psychological meaning of belonging to an organization.

A. Levels of Organizational Analysis and the Importance of Knowledge Flow

Several theorists have noted that organizations can be studied at three separate levels of analysis: the individual, the interpersonal, and the organizational (Pugh, 1964; Zaleznik, 1965). However, it is crucial to keep in mind that these categories are interdependent. One cannot discuss the behavior of organizations without reference to the actions of the people who are members of organizations. Nor can the activities of an individual be totally divorced from the constraints and expectations of the other people with whom he interacts and the groups to which he belongs.

This interdependence of levels takes on added importance in the context of this paper because information flow and utilization are vital for any organization. March and Simon (1958), for example, construct a theory of organizations on the belief that organization members--the people in the organization--are fundamentally complex information processors and that organizations are basically large decision-making units. Moreover, their major thesis is that the foundation of the organization is the *flow and rational application of knowledge to problems confronting the organization.* In other words, organizations are large, complex information disseminators and utilizers. Other theorists present similar views. For example, K. Deutsch (1966) discussing governmental structures, cites the critical nature of information flow and channels for survival of the governing structure. The information channels are described as the "nerves of government." Analogously, information linkages are the nerves of any organization, the essential connectors which allow the aggregate of parts to function as a whole. In short, though different, identifiable levels of analysis for the organization exist, knowledge dissemination and utilization is a vital process at each level.

Organizations are much more than collectivities of people. The people who belong to an organization must work together; they are *interdependent.* To effect such interdependence, members must necessarily communicate and utilize messages. For example, in order to fulfill the objectives of the organization there must be communication of what the objectives are as well as the means by which they are to be reached. In some organizations the knowledge flow may be quite elementary; for instance, it may involve being told that sheets of metal must be cut and that this and that lever must be pulled to achieve the various desired lengths. In other organizations the information flow is more complex. For instance, a high school teacher must know what materials to teach the students and the means to teach the students. In this case many types of knowledge reach the organization member, the teacher, and, in turn, the objective is knowledge dissemination.

In view of the essential nature of knowledge flow for the organization--at all levels of analysis--it is perhaps surprising that relatively little space in the literature on organizations is devoted to knowledge flow. Part of the explanation lies in the relatively recent genesis of the study and conceptualization of the field of knowledge flow (Havelock & Benne, 1967). Traditionally, organizational theorists and researchers have centered their efforts on such concepts as leadership, motivation, decision-making and structure; knowledge flow is almost always subsumed under these other headings. With several exceptions*, the topic has been given scanty treatment by major organizational theorists.

B. Organizations and the Flow of Information

To facilitate understanding of the material in this paper, a conceptual scheme has been adopted and applied to the relation of knowledge flow and the organization. This framework views organizations as open systems which is consistent with recent work in the field.

1. Flow in, through, and out of the organization

Organizations are open systems, i.e., external factors can affect change in the interrelationships of the parts of the organization. Some examples of the "openness" of organizations are: the addition to a school to house the rapidly increasing number of children; the elimination of certain jobs by an industrial firm prompted by the demands of a labor union; and the removal of liquor advertisements from a magazine because of the protest of concerned readers.

As open systems, organizations are characterized by three distinct phases in the handling of material (e.g., information, money, raw material, persons). The first phase is the flow into the organization of the matter to be processed, or the *input*. The second step is the processing or conversion of the resource as it travels through the organization into a desired state or product; this middle phase is often called the *throughput*. The third stage is the export of the processed material into the environment or the *output*.

This pattern of activities, characterizing all organizations, provides the framework by which we will examine the organization and knowledge flow. In other words, we will study the characteristics of organizations** that inhibit and facilitate knowledge flow *into*, *through*, and *out* of the system.

Information transmission *into* an organization is, generally speaking, a function of the openness of the system. As we will later enumerate, some of the organizational characteristics contributing to the willingness and readiness to accept knowledge are the leadership, coding scheme, social structure, local pride, status, economic conditions, linkage and capacity of the organization, among others.

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*Guetzkow (1965) and Seashore (1967) to name two.

**In this paper the term organization refers to the members as well as to the structure, policies, purposes, etc.

The passage of new knowledge *through* the organization (i.e., from one department or division or group to another) depends, as we will see, on such organization variables as styles of leadership, division of labor, role definition and performance, structural arrangements, reward systems and training among others.

The third stage of organizational knowledge flow, is the *exiting* of information. Here we are primarily concerned with such organizations as extension services, public service organizations and foundations. In these organizations linkage, transmission adoptiveness, and status are factors affecting knowledge output.

C. Patterns and Directions of Knowledge Flow

Before discussing some ways knowledge flow can be categorized, we would like to sketch part of a hypothetical organization. This example will serve to illustrate many of the concepts and operations presented in this section and in the rest of the paper.

1. A hypothetical organization: Washington High School

Dave Robbins is one of four physics teachers in Washington High School. The other three are Lee Allen, Scott Jones, and Bob Williamson. Together these four men compose the physics department. Lee is the coordinator of this department; he calls meetings to distribute news and information to his colleagues. Lee reports to James Farahger, head of the physical and social science division of the high school. Also reporting to Mr. Farahger are the coordinators of biology-zoology, chemistry-earth sciences, and psychology-sociology.

The chairmen of the various academic divisions report to the assistant principal responsible for academic affairs. All the assistant principals report to the high school principal. The principal, along with two other high school principals in the school district, compose the High School Group which is subordinate to the Superintendent of Schools and the Board of Education. All together this network of positions and reporting relationships is a description of the skeleton of an organization.

2. Horizontal and vertical flow

Returning to the basic distinctions of knowledge flow in the organization, we point out that information transmission can potentially occur between any two or more organization members. Also, organization members are not always on the same level. For example, Dave Robbins and Bob Williamson are on the same level of the organization; holding identical positions and reporting to the same person. On the other hand, Dave and Lee Allen are on different levels; they do not have the same positions, titles, status or responsibility. In sum, depending upon their position in the organization, we can speak of two organization members being on "the same level" or one member being "above" or "below" the other.

The flow of knowledge can be broken down into categories that readily classify whether the sender and receiver are on the same level of the organization or on different levels: these categories are *horizontal* and *vertical*. Horizontal knowledge flow occurs between members on the same level, while vertical flow occurs between members on different levels.

As will become apparent later when we discuss characteristics or organizations and barriers to knowledge flow, the distinction of horizontal and vertical flow and their subcategories which are about to be introduced are important ones. However, the basic horizontal versus vertical distinctions have been little used. Exceptions are several industrial studies which empirically "discover" the critical distinctions between horizontal and vertical flow (Simpson, 1959; Burns, 1954; Davis, 1953). Finally, even though there is firm empirical basis for recognizing and using these distinctions in organizational research, two authors, after a review of the literature, were forced to conclude that, "There are no studies of the distinctive types of communication which characteristically flow horizontally, upward, or downward in organizations, although such research is much needed" (Katz & Kahn, 1966, p. 247).

Why, until recently, was there such a relative neglect of both vertical and horizontal types of communication? The causes for this omission are to be found in the early history of the field of organizational theory--a genesis which formed the foundation for many more recent theorists and practitioners and profoundly affected the development of the field. Because of the significant impact of the first organization model on the direction and thinking of both organization theory in general and knowledge flow in particular, we will digress to introduce the reader to a bit of relevant history.

At the turn of this century, Max Weber observed that German factory workers were mismanaged, abused and utilized inefficiently by management. To enhance the functioning of organizations and to improve the plight of workers, Weber developed a model of the "efficient organization." The model, derived from several common elements he had observed in government bureaus, business firms, and the Prussian Army, was called "bureaucracy."

A bureaucracy was defined by at least seven characteristics:

1. A division of labor based on functional specialization.
2. A well-defined hierarchy based on a rational legal authority structure. (Legal authority is vested in the impersonal order of a person occupying a position of power. It demands obedience, not on the grounds of personality or tradition, but by reason of the legitimate status of the leader.)
3. A system of "calculable rules" covering all contingencies, rights, and duties of members. (The tremendous amount of legislation in a bureaucratic system is, in part, "protection for the member against arbitrary and abusive rule, a way of making his life in the organization more predictable and stable and less dependent on the personal whim of an arbitrary leader" (Tannenbaum, 1966, p. 9).
4. A recorded system of procedures and routines to cover all work situations.
5. Impersonality and impartiality of interpersonal relationships. Everything was done 'by the book.'
6. Promotion and selection based on technical competence.
7. Downward communication.

According to Weber his model is supposed to engender in organizations the highest degree of efficiency and "...the most traditional known means of carrying out imperative control over human beings. It is superior to any other form in precision, in stability, in the stringency of its discipline and in its reliability" (1952, p. 337).

Although Weber's model has been the foundation for much of the existing organizational literature there are several cogent criticisms of it*. The criticism most salient here is that it omits provision for upward and horizontal knowledge flow. It has, therefore, led many other theorists to make the same error, e.g., Miller and Form (1951), Gardner and Moore (1950), and W. Moore (1954).

3. Vertical knowledge flow: Upward and downward

Traditionally the dissemination of knowledge in organizations has been viewed as a flow of information *down* the organizational structure. As has been seen, the classical theories of organization placed primary emphasis on the *downward* flow of information and there was no corresponding emphasis on adequate and accurate *upward* knowledge flow. Even today we see this reinforced and perpetuated by the priorities in organizational training programs. Training usually focusses on improving downward information flow as from principals to teachers, foremen to workers. Rarely touched are recommendations to help a person communicate effectively with his own superior (Likert, 1961).

Recently, however, more and more theorists are advocating the importance of upward flow (Burns & Stalker, 1961; Seashore, 1967; Blake & Mouton, 1964, 1968). They recognize that subordinates often possess the skill and knowledge essential for organizational improvement; therefore, messages from subordinate to superior should be encouraged. Bennis (1966) states the general case that reliance solely on downward information flow for all communication is inappropriate for most organizations in our contemporary society. He maintains that full and open knowledge flow in organizations without regard to power or position is necessary and, in fact, inevitable if organizations are to survive. To cite one specific case, a researcher, discussing the mounting pressures on schools and school administrators finds "a discernable change in the way schools operate. Principals are relying less and less on direct orders to teachers and more and more on team participation of teachers" (Likert, 1968, p. 50).

4. Horizontal knowledge flow: Intragroup and intergroup

As we noted earlier, there has been an increasing awareness in recent years of the importance of *upward* knowledge flow in contrast to the traditional stress on downward transmission. There has also been a corresponding surge of interest in horizontal flow in the organization. Some researchers have found that knowledge flow among organization members on the *same* level is not only common but also beneficial for the overall purposes of the organization. One researcher, tracing the flow of specific items of information in an organization, discovered that more than one-half of the items reached their destination or end-point by some lateral flow (Davis, 1953). Another examined the flow of information in a factory and concluded that the "vertical system would be virtually unworkable without considerable flow of information laterally" (Burns, 1954, p. 92). Nealy and Fiedler (1968) have recently reviewed a number of studies concerned with organizational behavior. Although their primary focus was not on knowledge flow, they did draw a relevant generalization: they concluded that, on the basis of the empirical studies reviewed, lateral flow is much more prevalent than organization charts suggest. In short, horizontal flow is important in its own right for the understanding of knowledge flow in organizations.

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*For detailed criticism of the bureaucratic model see Merton (1940), Selznick (1949), Gouldner (1954), March and Simon (1958), or Bennis (1966). Each points out major dysfunctional aspects of the "bureaucratic organization."

Referring once again to our example of Washington High School, we can delineate two subcategories of lateral flow: intragroup and intergroup. When Dave Robbins and Bob Williamson communicate, knowledge transmission between members of the same group occurs, which is *intragroup* horizontal flow. If Dave consults an English teacher rather than a Physics teacher, the information passage is one of *intergroup* horizontal flow.

According to the traditional bureaucratic model of organizations, intergroup knowledge flow, supposedly, is unnecessary. Perhaps the rationale for this can best be presented by followers of Weber. "Reports, desires for services or criticisms that one department has of another are supposed to be sent up the line until they reach an executive who heads the organization involved. The reason for this circuitous route is to inform higher officials of things below them" (Miller & Form, 1951, p. 158).

Even though keeping superiors up-to-date is important, reasoning and empirical evidence show that organization members find it necessary to have information channels among groups (Burns, 1954; Landesberger, 1961, Walton, et al., 1966; Strauss, 1962; Schein, 1965; Seiler, 1963; Likert, 1967). The existence of horizontal information flow can perhaps best be illustrated in an industrial setting where groups are functionally quite different. A typical case may work as follows. The purchasing department learns of a new process to produce the organization's product with minor modifications. However, the purchaser must check with production; but the production department cannot give full okay until the sales group is informed and approval given.* In brief, intergroup flow must occur. Although several studies have demonstrated the existence of intergroup flow, only a few have shown that when intergroup knowledge flow is hindered the ability of the organization to function is severely handicapped. Walton, et al., 1966, for example, have found a very high, statistical correlation between intergroup information flow and organizational performance among six manufacturing plants.

To turn to a closer look at intragroup flow we can cite two different bodies of literature; one focusses on the "two-step flow" of information concept, the other on social-psychological studies.

In investigating voters' behavior during the 1940 election Lazarsfeld, Berelson and Gaudet (1944) postulated the existence of the two-step information flow. The hypothesis of the two steps was advanced because it appeared that information was channeling from radio and newspapers to a single responsive group member--an "opinion leader"--and from the opinion leader to the other members of the groups to which the opinion leader belonged. Each group, then, had one person actively receiving information from outside sources. Thus, there is not a direct connection between external news sources and individuals; the process is much more complex, involving the person's group affiliations and consequently, the nature of opinions and interpersonal relationships in the group. Evidently information transmission is mediated by group membership since it is specific group members who perform a relay function between external sources and the rest of the group.

The two-step information flow phenomena has been established both in the context of public opinion research and rural sociology research

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*This example was drawn from a study of purchasing agents (Strauss, 1966) and a study of the interaction among members of separate departments in an industrial organization under conditions of new knowledge (Landesberger, 1961).

(Katz, 1957, 1955; Rogers, 1962). Other research studies provide evidence for the two-step flow in organizations and, concomitantly, the importance of understanding intragroup knowledge in organizations. Jacobson (Weiss & Jacobson, 1955; Jacobson & Seashore, 1951) found that group members relied heavily on one "liaison person" in their group for information from outside the group; moreover each group in the organization they studied had a member occupying the role of "liaison person." Davis (1953) researching the activities of 70 managers in an industrial organization, found that only 10% of them were primary transmitters of knowledge; each person in that 10% belonged to a different group in the organization. Allen (1966) researching information flow in R & D labs, ascertained that each group of scientists in the lab had one group member who disseminated new knowledge to the group. Allen called this person the "technological gatekeeper." A study in a government agency provides further corroboration that intragroup knowledge flow is vital for information dissemination and utilization and that there are a few persons who monitor the information flow (Blau, 1954).

Intragroup flow can also be looked at in terms of social-psychological variables. For example, *cohesiveness* of the group affects knowledge flow. The more cohesive the group is, the more it will share and utilize information which members possess (Back, 1951; Festinger, et al., 1963; Cartwright & Zander, 1960; Seashore, 1954). Also the greater the *discrepancy* between members regarding a salient issue to the group, the greater is the intragroup knowledge flow (Festinger, 1950). Following from the last statement, the more relevance a topic has for the group the more new information on it will be sought and disseminated to group members (Schacter, 1951; Cartwright, 1959). These are some of the relationships between knowledge flow within a group and social-psychological variables. There are many more but since our purpose is not to inventory them here, we will make a summary observation and then move on. Because of the psychological nature of groups, we can say that, in general, intragroup flow is immutably related to group purposes and needs of uniformity or reality-testing (Festinger, 1950; Seashore, 1967), goal attainment (Festinger, 1950; Cartwright, 1949), and security (Tannenbaum, 1966; Schein, 1961).

To recapitualate: knowledge flow can be categorized in terms of organizational level, source, and destination. If the passage is between levels, it is "vertical" flow; "downward" or "upward." If the source and end-point are on the same level, it is "horizontal" flow; if flow is within a subunit, it is "intragroup" flow; if it is between subunits, it is defined as "intergroup" knowledge flow.

D. The Meaning of Organizational Membership: A Reciprocal, Partial Relationship

We now turn to look at two major concepts that shed light on the meaning of "organizational membership." First we will examine the concept of reciprocal expectations between the organization and its members, then partial inclusion of the members in the organization.

1. Reciprocal expections

The organization is dependent on its members for maintenance and survival; organization charts and physical equipment are of little value unless there are people to occupy the positions and run the equipment. In fact, several theorists refer to organization members as "human resources" to be considered assets on the accountants' balance sheet (Brummet, Pyle & Flamholtz, 1968, 1969; Likert, 1967).*

To meet this necessity of attracting and maintaining members, organizations utilize certain inducements. The most obvious is financial payment; other common ones are fringe benefits, advancement opportunities, social benefits, working conditions, job challenge, status, and job security. Some of these incentives, of course, are used for more than just recruitment and maintaining personnel. As we shall see later, it is not enough just to attract members, most organizations must also strive to evoke reliable performance and elicit innovative and spontaneous behavior (Katz, 1964, 1966). What this means is that the ideal member is one who is dependable and can respond constructively to unusual circumstances. For example, if our high school physics teacher, Dave Robbins, demonstrates consistently good teaching ability and, when the situation warrants, can improvise (an experiment on friction perhaps): this shows him to be such a member.

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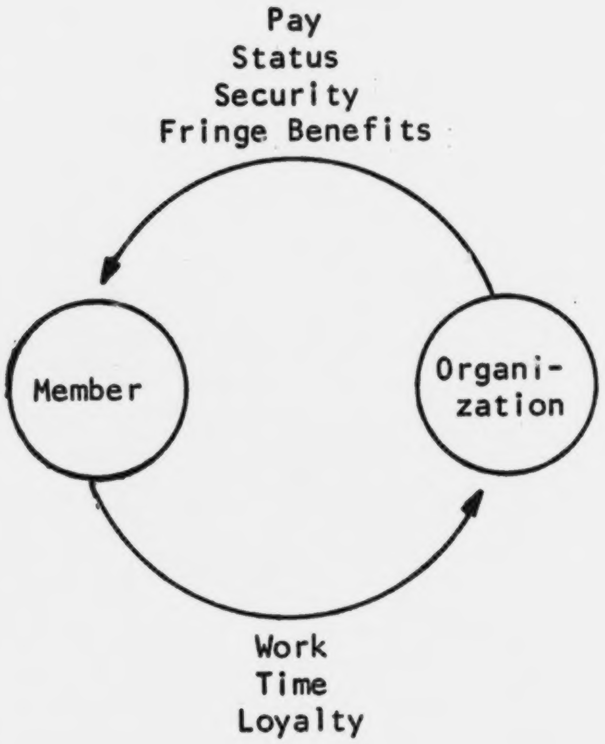
*This advance in conventional accounting techniques, sometimes called "human resource accounting" is exciting new knowledge that is just beginning to be disseminated and utilized by a few organizations. It will be instructive, in the next several years, to observe its rate of diffusion and implementation since it represents true progress in organizational accounting techniques as well as a radical departure from the existing, traditionally orderly and mechanical methods. A conflict of innovation versus stability is inevitable for organizations undertaking this new approach.

For the organization to operate effectively, members must act in certain ways and, to elicit these needed behaviors, inducements or rewards are provided. The logic of this argument is basic to the organization member's thinking. "Employees...make assumptions about the nature of organizations and expect organizations to behave in certain ways toward them" (Schein, 1965, p. 44).

Conversely, organizations expect certain contributions from their members. The member is expected to expend energy, to perform role requirements, to have a reasonable attendance record, to obey the directives of his supervisor and so forth.* Figure 1 depicts this two-way relationship.

Figure 1

RECIPROCAL EXPECTATIONS BY THE ORGANIZATION AND ITS MEMBERS



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*Etzioni (1961, 1964) treats the precise relationship between the organization's methods and its members' contributions in some detail. Specifically, he relates different means of organizational control to member involvement.

In the literature the "reciprocal relationship" has been identified as "norm of reciprocity" (Gouldner, 1960, "psychological contract" (Schein, 1965), "inducement-contribution balance" (March & Simon, 1958), and distributive justive (Homans, 1950). Whatever it is called, the principle of reciprocal expectations between organizations and their members is valuable for the general comprehension of organization functioning and, consequently, is applicable to the process of knowledge flow.

2. Partial inclusion

We mentioned that the type of inducement or reward offered by the organization is a determinant of the organization members' behaviors.* Specifically, the relationship that has been frequently advanced is that the more incentive provided, the more he will involve himself in the organization i.e., the more "included" he will be. With regard to this relationship, the point we wish to make here is that a member's involvement or inclusion in an organization is never complete; it is always *partial inclusion.*

F. Allport (1933) first proposed the concept of partial inclusion to explain the fractional involvement of people in social groups. In elucidating this concept Katz and Kahn say that "unlike the inclusion of a given organ of the body in the biological system, not all of the individual is included in his organization membership. *The organization neither requires nor wants the whole person*" (1966, p. 59, italics added).

This fact of partial inclusion explains some of the problems typically confronting organizations. Even though only a part of the person is used by organizations, the entire person is brought into the organization--all of his needs, values and skills, only some of which the organization calls upon. In essence the organization requires the individual to put aside some parts of himself. This has been called a "depersonalizing demand" (Katz & Kahn, 1966). One author contends that this demand impairs the member's self-identity and self-development leading to feelings of "psychological failure" and alientation**(Argyris, 1957, 1964).

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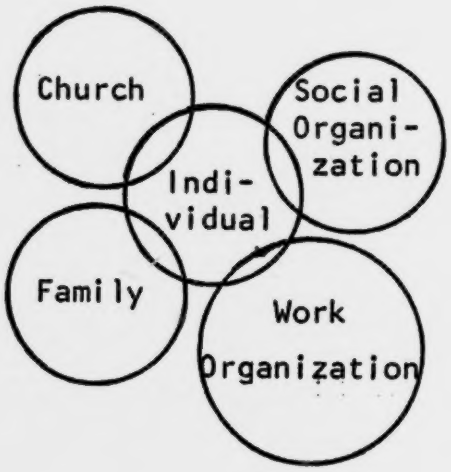
*For an extensive listing of factors affecting member's behavior see March & Simon, Chapters 3 and 4, 1958.

**Intragroup communication, as mentioned earlier, is a means to ameliorate some of the adverse effects of partial inclusion. Some needs are satisfied by informal communication among group members that are immaterial to the functioning of the formal organization. Some of these needs are: affiliation, peer approval, social security and friendship. The group, by virtue of satisfying these needs becomes a potent force in the organization, that is, one to be recognized and utilized. Further scrutiny of the "informal group" in the organization will come in the Leadership section.

The idea of an individual being only partially included in the organization can be diagrammed as in Figure 2.

Figure 2

PARTIAL INCLUSION OF AN INDIVIDUAL



In conclusion we note that the nature of the reciprocal expectations affects the degree of inclusion. An example probably will best illustrate what we mean. Dave Robbins expects several remunerations for his services as a teacher and, likewise, Washington High School expects the services associated with the job of a high school physics teacher. There is, in essence, a mutual understanding. One thing Dave does not expect, let's say, is job security. He has a one-year contract that is annually assessed by his superiors. Let us also say that Dave is given a five-year contract. He now feels that, in exchange for the security, he will put more effort into improving school-community relations or into recruiting good new teachers for the school. He, as a consequence, spends more time and energy for the school, i.e., he is more included as a member.

PART II

THE CHARACTERISTICS OF THE ORGANIZATION

A. Orderliness Versus Innovation

The basic question with which this paper is concerned is whether the organization inhibits or facilitates knowledge dissemination and utilization for itself. Again, generally speaking, one response might be that the characteristics inherent in most organizations tend to inhibit knowledge flow; however, most organizations, if they are to survive, must take steps to overcome the barriers and facilitate knowledge flow. A short explanation of these rather broad statements seems in order. In order to understand why organizations tend to block new knowledge and innovation, it is necessary to recognize what the organization represents and how the environment influences the organization.

The organization is a stable, enduring interrelationship of equipment and positions occupied by people. It has "objectives, formal and informal rules, values, punishments and rewards, styles of personal behavior and a language of its own and manages to maintain these characteristics in something like a stable state, even though its members may frequently change" (Schon, 1967, p. 57). Furthermore, to enhance the stability of its functioning the organization has broken down the activities it performs into small internally consistent tasks, i.e., it maintains a division of labor. It is the division of labor, seen as essential to organizational functioning, which yield groups in the organization that jealously guard their own values, goals, and tasks to the point where they are part of their personal identity (Bennis, 1966; Burns & Stalker, 1961; Schon, 1967). As a result of these differentiated and internal cohesive groups, there is a demand for the orderliness of continuity and certainty and, concomitantly, resistance to change, a resistance which impedes the flow of new ideas and their utilization.

Moreover, the organization itself inherently strives for orderliness of functioning. It has been typified as endeavoring to maintain a "steady state" (Katz & Kahn, 1966) or a "quasi-stationary equilibrium," where a force from one direction is countered by a push in the other direction in order to compensate (Lewin, 1951) and "dynamic conservatism ...to maintain "regular, orderly, linear, predictable processes" (Schon, 1967, p. 65). New knowledge and innovations can be a threat to the continuity of orderliness since new ideas call for change, for a break up of the traditional patterns and structures of organization activities. New information may jeopardize the basis of organization; therefore, its dissemination and utilization may be resisted.*

If we accept the premise that organizations are committed to stable and orderly activities, it remains to determine the extent to which this compulsive pursuit of a steady state is functional in today's environment. A review of the literature suggests that, in fact, the rapidly changing environment, in terms of technologies available, labor force and market demands, compels organizations to adopt new knowledge and innovate if they are to survive (Bennis, 1966; Burns & Stalker, 1961; Schon, 1967, Marrow, et al., 1967; Lippitt, et al., 1958; Miles, 1964). Earlier in this century the physical and behavioral sciences were not advancing as rapidly as they are today; also the industrial sector of our society was just beginning to grow and there was plenty of room for new industrial organizations (Heilbronner, 1966). Today all this has changed; the product and service organizations have increased to the point where fierce competition exists for markets and members. Moreover, the explosion of scientific knowledge and the increasing awareness of potential requires that organizational change in response to new knowledge, new technologies, new product lines, and new consumer demands be the rule and not, as in historic times, the exception.

A great deal of evidence on the complexity of the organizational environment is available. To mention just one, Schon (1967), after studying several industries including the electrical, chemical, machine tool, and building industries, concludes that organizations which do not generate new knowledge for themselves typically undergo major change by the incursion of independent inventors, new small firms, foreign countries, and invading industries. In short, the facilitation of knowledge entry and utilization has become a necessary and paramount function of most organizations.

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*There are several lucid case studies documenting this fact. Morrison (in Bright, 1964 and Bennis et al., 1962) studied the Navy's resistance to the adoption of continuous aim artillery on ships. Burns and Stalker (1961) discuss the resistance to R & D departments manifest in Scottish electronic firms and other organizations. Schon (1967) presents in vivid detail many cases of organizations inhibiting knowledge flow, and he examines several industries in depth. He finds that the sources of new knowledge are from outside of established firms or what he calls "innovation by invasion."

The author's own experience also provides evidence. He has been a member of a group working with several different organizations and has seen one organization, in particular, take emergency measures to salvage itself because, for many years, it was profitable, and as a result stimulated no influx of new knowledge nor had it fostered innovation. Recently competing organizations had caught up and surpassed it. Recognizing these circumstances, it reorganized and began straining for new knowledge in order to survive.

Thus a paradox arises. Organizations, to insure the certainty, rationality and orderly activity needed for productivity and social group maintenance tend to inhibit knowledge flow. The environment, in which change is ever present, necessitates knowledge flow. It is now the task of the rest of this paper to detail the organizational properties inhibiting information flow and some mechanisms by which knowledge dissemination and utilization in, through, and out of the organization is facilitated.

In the remainder of this section we will try to describe the major features of the organization. These features can either be inhibitors or facilitators of message transmission depending on how they are utilized by the organization. If they are employed to preserve the stability and reduce uncertainty, then knowledge flow may be impeded. If the organizational characteristics are used to enhance flexibility and innovation, then knowledge flow may be enhanced.

B. Orderliness

At Washington High School, Dave Robbins does not do whatever he pleases. The organization in which he is a member imposes a number of constraints on what he does, and when and how he does it. The number of restrictions emanating from the organization varies with the nature of the organization; prisons and convents usually maintain more rigid control over the activities of their members than do industrial firms; industrial organizations usually impose more constraints over their members than do universities and R & D labs.

All organizations restrict and pattern the activities of their members, and by so doing they strive to create and preserve *order* in their normal operations. Further, the maintenance of orderliness or stability is paramount if an organization is to survive. Many authors have postulated that without arrangements for orderly activity, all complex social groupings tend toward "entropy" or disintegration into random elements.

Patterns of ordered activities in organizations are illustrated by: *predictability*, *uniformity*, *repetition*, *normative descriptions* and *replaceability* (Tannenbaum, 1966; Barrett & Tannenbaum, 1968).

Predictability is manifest when members of the organization can state in advance what will occur given some a priori knowledge of the organization. Thus, based on previous experiences and knowledge, it is possible to forecast certain occurrences. In other words it is possible to *plan*. Dave Robbins, for example, can be expected to arrive at school no later than his first class. Another example, central to this paper, is the very high degree of predictability of knowledge flow and utilization in such institutions as hospitals and R & D labs. In fact, the regularity and predictability of information flow is, as we have stated, essential to the functioning of all organizations.

A second dimension of order, *uniformity*, is manifest in many ways in organizations. All the teachers at Washington High School arrive at a certain time in the morning and wear clothes appropriate to their sex and the school setting, give grades to their students, and so forth. These are examples of conformity to certain codes and standards of the organization. There are, of course, differing degrees of uniformity from organization to organization. Hospitals are characterized by a great deal of uniformity of activity among their members (including patients) whereas universities (including students) are not.

Enduring organizations also show uniformity through time, i.e., *repetition*. If repetition of organizational processes or activities does not occur, then it is logical to assume inefficiency and, to some degree, disorganization. Without the essential patterned recurrence of processes and behavior in organizations, the arresting of the tendency toward disruption and, therefore, the maintenance of the organization is imperiled.

The fourth manifestation of orderliness is *normative descriptions*, i.e., rules, policies, work procedures, charts, constitutions, and articles of incorporation. Normative descriptions encourage order through the presence of material delineating the activities, procedures, and structure of the organization. The normative descriptions also serve to identify and perpetuate the uniqueness of the organization (Bakke, in Haire, 1959).

A fifth dimension of order is *replaceability*. To illustrate, if Dave Robbins received a job offer to become an industrial researcher, another teacher with similar qualifications can probably be recruited into the system to take his place. Order then is partially predicated on impersonal job requirements, i.e., the fact that given some certain basic skills, it makes no difference who performs the task. This fact is basic to the stable performance of an organization relative to the transiency of its members.

Each of these illustrations of orderliness is manifest in many ways in organizations: plans and schedules indicate predictability; rules and policies help produce uniformity, reward systems prompt repetition, job descriptions envince normative statements; personal tests signify certain commonality among members. The product is preordained and patterned communication, coordination, decision-making, knowledge utilization, leadership among organization members, to name just a few organizational variables.

C. Purpose

Order is not an end in itself; rather, it is instrumental in attaining certain prescribed ends, goals, or purposes. All organizations have at least one goal and most have more than one. Although the usefulness and the meaning of the concept of organizational goal has been argued in the literature (Rice, 1958, 1963; Selznick, 1957; Dent, 1959; Etzioni, 1964; Katz & Kahn, 1966 are just a few of the participants), if care is exercised in operationalizing the concept, it is a useful one in dealing with organizations. One author who uses the concept to advantage is Rice. Rice (1963) constructs a model of organizations from the idea of "primary tasks." Recognizing that subparts may have different objectives or "primary tasks," he considers the importance of making the unit of study the smallest unit of the organization possessing a primary task. However, he does not lose sight of the fact that each unit's primary task contributes to the overall goal of the organization, or, as another author aptly says, "the mission of the organization" (Selznick, 1957).

All things considered the concept of organizational purpose, when understood and used carefully (e.g., Rice), adds to a basic understanding of the organization. This is especially true in the context of the discussion on orderliness or stability as a prime common feature of organizations. It is not enough to say that nonrandom or ordered activities occur, for that leaves untouched the question: order for what purpose? The question can be answered--hence organizations can be better understood--by recognizing orderly activity is instrumental for the goals of the organization and its subparts.

Coinciding with the three levels of organizational analysis mentioned earlier, we should note that group members and groups in an organization may have distinctly different goals. Each level can be separated and studied with regard to its own goal. Yet we must keep in mind that the member, the group and the organization are interdependent. Therefore, for a full understanding of the operations of the organization the goals of individual members of of groups must be studied with an eye on the purported goals of the organization as a whole.

D. Mechanisms of Stability

If we accept the fact that organizational primary tasks can be identified and that human behavior must be ordered to some extent to efficiently accomplish the primary task, then we must be able to stipulate what mechanisms organizations use to promote task accomplishment through achieving orderly behavior and functioning.

1. Specialization or division of labor

Dave Robbins teaches only physics, each of his colleagues also teaches only one subject. One of Dave's friends is a doctor specializing in internal medicine, another is an obstetrician. When Dave was in the army he loaded a cannon, another soldier's job was to aim it. These are all examples of division of labor or specialization within an organization.

The division of labor is a cornerstone of organizational theory. Basically, specialization is the aggregation of similar or related activities into a defined task for one person or group within the organization. Each person is allowed to *specialize* in a certain exclusive subset of activities rather than being involved in a large number of organizational activities. Whereas the earlier organization theorists identified specialization only by task or work, i.e., a horizontal division of labor, Simon (1945) added a vertical dimension--the division of labor according to authority or decision-making responsibility. Thus a job can be looked at from two perspectives: how similar its task activities are, and to what extent decision-making duties are part of the work. Thus knowledge flow is especially central to the vertical division of labor for typically the higher up in the organization a person is, the more his job involves decision-making and the necessity of new knowledge (Simon, 1945).

The concept of specialization originated in the work of Taylor (1911) and has been intensively developed since; however, not always to advantage. Classical administration theory, epitomized in Gulick and Urwick's work, had the concept of the division of labor as its cornerstone. To these theorists organization efficiency was dependent on the ability to break down jobs into their simplest parts and to reconstitute them into task with activities as homogeneous as possible. To accomplish this, Gulick offered four bases by which to determine how activities should be combined: purpose to be served, process to be used, client to be served or materials to be handled, and location of activities (Gulick & Urwick, 1937).

This four-pronged approach to specialization has met with some disapproval. Etzioni (1964) cites the four-principle approach as difficult to apply to actual situations since the bases of distribution sometimes overlap and at other times are inconsistent with one another. As an example, he offers missile building for military use. "Should the missile program be assigned to one branch of the armed forces or all three, since missiles can be used on land, sea and air? Should we have a single missile force because all missile building requires a common fund of knowledge? Should we build a number of different regional forces because some missiles are built for Europe's defense and some for U. S. defense?" (Etzioni, 1964, p. 24).

Empirically, even though the usefulness of division of labor to evoke orderly and efficient activity has been amply demonstrated in many settings (LaPorte, 1965; Lorsch & Lawrence, 1965; Price, 1964) its abuses have also been pointed out. Likert (1961), Schon (1967), and Argyris (1957) discuss cases of specialization that, by virtue of its fractionation of jobs into such simplified activities, defeats the purpose and produces inefficiency. When jobs are extremely routine and markedly different among groups in the organization, the boredom and the loss of interest in the organization as a whole adversely affect the functioning of the organization.

There is a fair amount of evidence supporting this argument (Mann & Hoffman, 1960; Walker & Guest, 1952; Schon, 1967). Thus the application of division of labor to the organization can be overdone.

2. Roles in organizations

Because organizations are capable of isolating and differentiating themselves from their environment through the existence of boundaries, they are relatively free to institute and enforce patter of behavior on their members. With these patterns of member behavior in place, the organization can achieve order and efficiency to the extent that the behavior patterns are based on organization task requirements (Udy, 1966). In other words, member activity can be purposefully limited thereby creating an organization "rationality." Thus these behavior patterns defined by the organization are parimary mechanisms for defining and institutionalizing a division of labor.

These behavior patterns are called *roles*. Specifically Katz and Kahn define organizational roles as "standardized patterns of behavior required of all persons playing a part in a given functional relationship, regardless of personal wishes or interpersonal obligations irrelevant to the functional relationship" (1966, p. 37). That Dave Robbins should prepare lectures for his classes, oversee one study hall, and give grades are examples of role requirements. Furthermore, organization members, then, are tied together or integrated by the functional interdependence of their roles.

The concept of role is not as simple as it may appear at first glance--in theory or in practice. Levinson (1956) notes that a great deal of ambiguity comes from treating role as a unitary concept. He proposes three separate constructs be used in place of "role." The requirements imposed upon the member by expectations constitute the *role demands*. The way in which the member perceives his role is his *role conception*. *Role performance* is the actual behavior of the member. In this way the influence of both the organization and the personality of the member or the role performance is recognized. Katz and Kahn, utilizing a similar scheme, call the constructs: sent role, received role, and role behavior (1966, Chapter 7).

Sometimes role demands on an individual are not clear, i.e., the expectations of others are poorly defined or unclear. This is commonly termed *role ambiguity*. At other times a person may comprehend the demands on him but the expectations themselves may conflict. In such a situation the person perceiving expectations which are incompatible cannot fulfill one demand without violating the other. This is called *role conflict*. Several authors have pointed out that role conflict can and often does have adverse effects on organization members (Michael, 1967; Eisenstadt, 1964).

Gross, et al. (1958) studied the concept of role and shed some further understanding on the concept. They noted that role conflict or incompatible expectations can stem from occupany of a single role (intrarole conflict) as well as from multiple position occupancy (interrole conflict). Expressed another way, a role incumbent can receive demands from one person which conflict with the demands of another (intrarole conflict) or he may occupy two or more roles that impose divergent behavioral requirements on him (interrole conflict). A teacher who wants to spend more school time with students but is prohibited by membership in a teacher association which governs the amount of time spent in actual instruction is an example of the latter. Gross et al. also propose the concept of *role congruency*. When a person perceives that very similar expectations of him are held by others, role congruency exists. One example of role congruency is a school superintendent who perceives that his school board, principals, teachers, and students all expect him to handle a discipline case in one certain way. Gross and his colleagues also enumerated styles of resolving role conflict. One way is to fulfill the legitimate expectations of others and reject the illegitimate ones; the person with this orientation is called a "moralist." Another way is to enact the expectations that lead to the least negative sanctions. This person, the "expedient," is guided, then, by the relative severity of sanctions accompanying conflicting demands. The third orientation is weighing both the legitimacy and the sanctions of conflicting expectations and behaving in accord with some compromise; this type is termed the "moral-expedient."

If role conflict is not present, the effectiveness of the organization member should be related to the extent of role agreement between an administrator and his subordinate. This has been shown to be the case among teachers and school administrators (Bible, 1963).

3. Technology

Another feature of organizations that contributes to the stability and efficiency of operation is the technology the organization employs. Technology refers to the equipment employed to accomplish the primary task. It can refer to spades, books or computers. The term is most frequently used with reference to organizations that yield a tangible product or service although it is applicable to other organizations such as schools. For example, the technology of teaching high school physics involves text books and laboratory equipment for experiments.

Although it seems reasonable to say that as technology improves the efficiency of the organization will improve, empirical evidence does not unequivocally support this relationship. Jasinski (1959), Rice (1958, 1963), Trist and Bamforth (1951), and Marrow, et al. (1967) are a few researchers who have had to reassess and qualify the simple relationship between improved technology and performance. Jasinski, for example, discovered that technological change affects information flow in the organization due to the rearrangement of people. Unless the effect on physical and social relationships is considered, it can negate some of the benefits of technological improvement.

4. Compensatory rewards

It is a basic fact of organization life that members expect to be compensated for their contributions. In addition to monetary payments, status, approval, satisfying own needs, and self-expression also serve as incentives for orderly and efficient behavior.

5. Organizational training and assignment

The training of members represents one of the most extensive personnel activities inmmodern organizations (Fleishman, 1961). Accordingly, training has been widely researched to ascertain what training methods are more effective than others (Bass & Vaughn, 1966). Also the application of the sophisticated principles of learning theory to organizational training have been explored (McGehee, 1958).

Because training, to some extent, presupposes knowledge of where the trainee will be assigned or, at least, where the vacancies are, it seems reasonable to consider training and assignment as closely related. This is not the convention; Haire (1967), for example, treats the two as separate entities. However, if training is to help the organization, it must teach a person what he will need to know and this depends on where he is placed. This is not to say that assignment fully prescribes the training. Broadly speaking, training can aid in "1) orienting and indoctrinating a new employee, 2) teaching him the specific knowledge skills and attitudes he will need, and 3) providing opportunities for education and self-development which will make it possible for the employee to rise successfully within the organization" (Schein, 1965, p. 34).

Recently training has gained added importance because rapid advances in many fields are confronting more and more organizations with equipment and skill obsolescence. When the labor market was easy to tap, organizations were much more prone to dismiss members with outmoded skills. Today, however, the organization is more likely to retrain the person to keep up with modern technology and increasing task complexity. For example, instead of hiring a new physics teacher, Washington High School would send Dave Robbins to a local university for further training in his profession. This not only preserves the skills he has developed while teaching but also facilitates teacher identification and commitment to the school because he realizes he will not be automatically dismissed if knowledge in his field increases rapidly.

Besides training members to fulfill certain roles, organizations must check that the objectives of the training are appropriate to the existing conditions of the organization and, if they are not, that diversity and pressures for change will be tolerated. Fleishman (1953), Sykes (1962), and House (1967) cited instances where members of industrial firms underwent training programs only to find their new knowledge and skills incompatible with the general way things were done in the organization. In every case, the role conflict produced adverse effects, e.g., not utilizing new knowledge (Fleishman, 1953) or leaving the organization (Sykes, 1962). In short, appropriate training and subsequent assignment loom as increasingly important ways to teach methods that facilitate efficient behavior and orderly knowledge flow in light of the rapid changes that impinge upon the organization.

6. Organization structure

To Dave Robbins the words "organization structure" brings to mind the organization chart discussed at the beginning of this paper. However, it is much more than just lines on paper depicting connections among organization members. Basically, organizational structure is used to denote the systematic and orderly relationships the diverse positions and parts of an organization have with one another. Structure is part of the organization and, as such, is a relatively stable and formal set of specifications of linkages, information flow channels, and reporting relationships among organization members. It is not difficult to understand the relationship between "structure" and "order" since the two are often used interchangeably. Typically the structure of the organization is largely a product of conscious planning with organizational objectives in mind; as such it provides a framework which discourages unnecessary linkage, knowledge flow and relationships.

There are numerous properties of organization structure. We will briefly discuss several of them.

a. Hierarchy: Organization levels -- It was noted earlier that knowledge flow can be dimensionalized horizontally or vertically, the latter referring to flow between the levels of the organization. Taken altogether, the levels comprise the hierarchy of the organization; each level is one layer of the hierarchy.

Typically as one is promoted in the organization, he gains more discretionery power, leadership responsibility and control over others below him in the hierarchy. In this context some theorists view organizational levels as a *hierarchy of authority*. One author states, "...in most of the organizations in which we are involved, authority is usually embodied in a complex hierarchy of positions or ranks"(Schein, 1965, p. 8).

b. Span of control -- The number of subordinates reporting to a superior constitutes his span of control. Since the conept's origination by Graicunas in 1933 (Gulick & Urwick, 1937) there has been much said in the literature concerning *optimum* span of control for a superior. How many persons can be placed under the authority of one man so that on the one hand, he is not stretched too thin, and on the other hand, has enough to do. Most theorists have suggested anywhere from three to six (e.g., Dale,

1952) under the assumption that a small span of control was best for the organization (Porter & Lawler, 1965).

There are some writers who maintain that relatively large spans of control are better for organization member performance because there is greater opportunity for intragroup knowledge flow. This is in line with data presented by Haire (1959). He showed that among several industrial organizations the most successful one was characterized by the largest span of control.

In any case, the optimal number of subordinates will probably vary, depending on such factors as organizational level, technology, division of labor and personalities of administrators (Fisch, 1963).

c. Size -- Another feature of organizational structure is the number of members, or size. Much of the literature supports the thesis that the smaller subunits of an organization are more productive than larger sized groups in the same organization. Porter and Lawler (1965), however, disclose that the empirical evidence does not clearly support this thesis.* They find that subunit size is related to job satisfaction, member turnover and absenteeism.

The size of the total organization may or may not affect the orderliness and efficiency of the organization member. If additional members are used to help other organization members do their jobs, they enhance the orderliness of the organizational activities. If new members function independently of existing subunits, they may either have no effect (Porter, 1963) or may depreciate the efficiency of other groups (Burns & Stalker, 1961).

d. Height -- The fourth manifestation of structure, the heights of an organization, is distinguished by the number of levels in the organization relative to the total members of the organization (Porter & Lawler, 1965). Specifically a flat organization structure contains a small number of levels relative to the number of organization members in it whereas a tall organization has a large number of levels relative to its number of members.

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*One reason for this may be that larger groups offer more immediate knowledge sources and, as mentioned under Span of control, offer greater opportunity for knowledge flow.

The heights of the organization is a joint function of size and average span of control. When small control spans are the rule and the organization is large, a tall structure is implied. In a small organization, flatter structures may lead to greater efficiency whereas in larger organizations, a taller structure--one with more levels--may be best (Porter & Lawler, 1965). The explanation can again be traced to utility of information flow. From their study of the League of Women Voters, Smith and Brown (1965) provide evidence that larger units must emphasize coordination or control while smaller ones can concentrate on facilitating information flow. Control is enhanced by smaller control spans, message transmission by larger control spans.

e. Decentralization -- Most recent writers contend that decentralizing an organization improves primary task behavior. They reason that members at lower levels not only hold the relevant knowledge to determine policy and procedures but also are more likely to accept decisions they had a hand in making (Maier, 1955; Guest, 1962; Schon, 1967; Tannenbaum, 1966).

Given the advisability of decentralization, there remains a strategic question: In what way(s) should an organization decentralize? Several options include the level of decision making, the persons involved in decision making and policy formulation, geographical dispersion, number of organization levels, or even the set of management assumptions used. The literature is unclear as to the specific operations involved in decentralization (Wolff, 1964).

f. Linkage network -- A linkage network refers to the structured connection and interactions among organization members. As should be obvious by now, organizations must establish channels or links by which information can flow from resource members to user members in order to maintain orderly organizational activities. The system of links established in this manner comprises the linkage network.

Earlier we stated and enumerated the types of flow (or linkage) which are vertical and horizontal. At this point we can add to it by noting that vertical and lateral *multiple linkage*, i.e., where an organization member is part of more than one vertical or lateral channel of information transmission, enhances orderly organizational activity. As one author expresses it, "The flow of information in organizations is more reliable and greater in amount when there are provided alternative means and channels for transmission" (Seashore, 1967, p. 29).

We hasten to mention that totally free and open knowledge flow is *not* optimal. Orderliness requires some restriction of available alternatives of activity.* Without reducing the number of possible linkages, there is no identifiable structure.

A factor related to the linkage network is the capacity of the organization. Capacity refers to the availability of the organization to marshall its diverse resources and corresponds to the number and diversity of existing linkages (Deutsch, 1966). Naturally, multiple linkage indicates greater capacity than just one unbroken line of information flow.

E. Leadership in Organizations

1. Integration of the member:

The major characteristics of organizations enumerated so far have been impersonal and mechanical in nature. Recall, however, two things: 1) the necessity of considering the organization and its members as interdependent; and 2) the constant referral to member behavior, especially information flow, while discussing the mechanisms promoting orderly functioning. Together they assert the importance of the human or personal element of organizations.

The person who holds membership in an organization does not automatically and unflinchingly accept the provisions of orderliness and structure placed on him. The organization member--each of us is one--has personal needs and feelings, and values and goals that are not by some predeterministic mechanism always consonant with those demanded by the organization. Moreover, one organization member may have different needs than another, and these two form a third and so on. All the individual, personal characteristics a person carries with him into the organization cannot be dismissed and since they can affect the functioning of the organization they must be reckoned with.* This fact has not gone unnoticed in the literature.

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*As is probably evident, there can be too much or not enough orderliness in an organization. A bureaucracy demands too much order; unclear structure or role definition represents insufficient orderliness.

The leadership methods used to try to regulate and integrate the human or social element in the organization range from strict control and boss-centered to subordinate-centered and democracy (Tannenbaum & Schmidt, 1958). These methods, as the other mechanisms for maintaining order and structure, have a considerable impact on knowledge flow and all other forms of organizational activity. Thus we turn now to discussion of leadership in organizations.

2. Traditional and modern views of leadership

At the turn of the century the prevailing belief was that all leaders had to do was accurately and clearly tell subordinates what their tasks were and specify how to accomplish them. Like machines, the organization members were to obey to the letter what the leader decreed. It was also assumed that organization members worked solely for their economic self-interest; therefore, superiors merely had to tell subordinates the best way to do their jobs (Taylor, 1911).

These assumptions were discredited in the late 1920's when subjected to empirical research by Mayo (1945), Roethlisberger and Dickson (1939) and others. Their findings can be summarized as follows.

The members of an organization:

1. are motivated by social needs,
2. seek satisfaction in social relationships on the job,
3. are more responsive to the social forces from their peer group than to the demands and constraints of their superiors,
4. will accede to superiors to the extent that the demands meet their social needs, and
5. will create informal organizations that satisfy their social needs. Two researchers state that, despite the depersonalized atmosphere, "large groups

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*It has been stated that "the degree of conflict between the needs of the organization and those of the individual appears to be a major determinant of organizational effectiveness. A review of the contemporary organizational literature (Argyris, 1964; Likert, 1961; McGregor, 1960, to name the best known) shows that a major portion is devoted to either describing or resolving this conflict" (A. Frohman, 1969b. p. 6).

> tend to develop subcollectivities--subordinate, small, face-to-face, informal groups or units--within them" (Rome & Rome, 1963, p. 258). These unofficial structures may act at cross purposes with the formal organization and serve as *barriers* to information flow.

Thus managerial techniques based on the set of assumptions involving economic motivation and totally rational behavior were not at all appropriate for securing the contribution from subordinates that they were capable of making. In essence leadership strategies had failed to understand human behavior and, in consequence, had failed to suggest techniques for harnassing and utilizing the potential of organization members. A drastic change in the strategies of administration was necessary.

Partly as a result of the research of the 1930's, many theorists have presented a whole new conception of leadership. These authors present several points in common:

1. The organization member is viewed not as an ignorant, indolent person but as a largely *untapped resource of knowledge* (Miles, 1965; McGregor, 1967).
2. The organization member can, and is willing to, contribute knowledge on matters of concern to the organization if called upon (Likert, 1961; Guest, 1962; McGregor, 1967).
3. The organization member is capable of expanding his area of responsibility as his skill and experience grow (Argyris, 1964; McGregor, 1960). One way organizations utilize this fact is for control procedures to be in the hands of those involved in the task rather than in superiors (Miles, 1965; Rice, 1963; Bucklow, 1966).
4. The organization member is a complex unit. He has needs, values and goals which change over time and which may differ from those of another person. Also since his background is probably quite different from any other organization member, he should be treated in light of his own interests and experiences (Likert, 1961; Schein, 1965).

The new view sees leadership as the ability to *integrate* the demands of the organization on its members and the personal needs of the members. Rice states that "leadership involves sensitivity to the feelings and attitudes of others, ability to understand what is happening in a group... and skill in acting in ways that contribute to, rather than hinder, task performance (1965, p. 5).

It is not our intention to review the massive amount of work done on organizational leadership. This has been done by several authors, e.g., Cartwright (1965), Gibb (1954), Tannenbau (1968), and Stodgill (1948). It is our aim to discuss leadership in such a way that its relation to knowledge flow will be made clear.

3. Dimensions of leadership behavior in organizations

Leadership can be thought of as a unitary concept. However, like many concepts its unity fades when trying to apply or operationalize it. It seems useful, therefore, to identify the dimensions of leadership *behavior*. The direction this discussion will take is premised on the necessity for administrative behaviors and skills to accomodate and reconcile the demands of different parts of the organization on one another.

Some years ago a series of research efforts produced two general and independent factors constituting leadership behavior (Stodgill & Coons, 1957). These dimensions were *consideration* and *initiating structure*. Consideration involves behavior demonstrating trust and respect of subordinates. Initiating structure covers activities that are in line with traditional administrator tasks such as organizing, planning, and controlling. Two other theorists, Cartwright and Zander (1960), have postulated two tasks of group leaders that bear a resemblance to the Ohio State University leadership factors. They described leadership behavior in terms of *group maintenance* or preserving the integrity and enhancing socio-emotional satisfaction of group members--the group being the superior and his subordinates--and *goal achievement* functions. Note that in the former there is explicit acknowledgement of social factors in relating subordinates to the organization.

R. Katz (1955), Katz and Kahn (1966), and Mann (1964) each offer a set of three skills comprising leadership behavior which are quite similar to one another, and in general, similar to the above. They list human relations skills, technical skills, and administrative skill as the components of leadership. The mix of these skills needed in an organization depends on such factors as organization level, technology, and demands on the organization.

Bowers and Seashore (1966, 1967) offer empirical and theoretical arguments for four dimensions of leadership behavior. *support* (enhancing a subordinate's feeling of personal worth and importance); *interaction facilitation* (encouraging group formation and cohesiveness); *work facilitation* (coordinating, planning, and providing technical knowledge and equipment); and *goal emphasis* (encouraging high performance and goal attainment). Bowers and Seashore add that these leadership behaviors can be exhibited by leaders as well as their subordinates, i.e., peer leadership. Thus "leadership" can be provided by anyone in the group or, for that matter, in the organization.

4. Encouragement of information flow inside organizations

When leaders possess the skills described above, this can lead to: *a higher quantity and quality of information flow in the organization.*

We can illustrate this point by taking the case of James Farahger, Dave Robbins' boss:

James Farahger, chairman of the science division, is confronted by questions requiring answers practically every time he turns around. Science teachers are asking questions about the curriculum or method of teaching or testing or scheduling. He has distraught parents claiming that they think an experiment is too dangerous or homework is too easy or too hard or something. He has other chairmen coming to him with questions on procedural matters and policy formulation. In short, he is bombarded by demands to select among alternatives and follow just one course of action. He is always making decisions.

There are fundamentally two distinct ways to choose among alternatives when making a decision: 1) the closed approach where all the possible alternatives are tried to see which one works best; and 2) the open approach where as much information is possible on the question and the potential solutions is gathered, the information is sorted and weighed and a decision is made on the basis of the evaluation. Often the first method is uneconomical, time-consuming and ignores knowledge of others concerned. The second method, though not utilizing a trial period, does not typically have these disadvantages.

Mr. Farahger decides in the literal sense to open and seek the knowledge of other persons concerning the particular question; in other words, he uses other persons as resources. This method usually involves two of the leadership dimensions proposed by Bowers and Seashore. Interestingly, they are the two least associated with an administrator in the traditional sense. When Mr. Farahger consults Dave Robbins and other science teachers on questions of common concern, he often displays behavior that is supportive and that facilitates interaction. He is implicitly saying to them that he values their knowledge enough to ask them to contribute to the decision. This is supportiveness. Instead of asking teachers one at a time for their opinion, Mr. Farahger saves time and calls a meeting. This way he not only receives the knowledge of other members of his organization, he also provides an opportunity for each member to evaluate and respond to the contributions of others. In short, he facilitates their interaction and at the same time, his job of evaluating what they say is aided by the critical comments of others in the group.

We can go back and recall the basic distinctions of knowledge flow. One of the points made was the importance of utilizing upward as well as downward flow and intragroup and intergroup lateral flow. Mr. Farahger is doing so.*

So far we have seen that a useful method of decision making or problem solving in the organization involves encouragement of communication among relevant organization members. Also we see that this procedure fulfills several leadership functions. Now Mr. Farahger is ready to select among the alternative courses of action. He recognizes part of his duty as an administrator is to make decisions and to make them in the interests of the organization so that its activities and functioning are not impeded. Accordingly, his criteria are based on the objective of facilitating the work done in the organization whether it is a question of policy interpretation, teaching assignments, books purchased or any other issue relevant to the school. In short, he is a work facilitator.

He sifts the information given him, evaluates its validity, weighs alternatives and assesses feasibility. Some information he judges not to be applicable, some is utilized. The solutions he has heard and thought of himself are ranked and finally, one is chosen. We can safely say that the particular answer was selected because of knowledge of opinions offered by other organization members. Thus, the decision reached was in part due to the cogency of the information from others; in short, Mr. Farahger was influenced.

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*For an actual comparison of the effects of two administrators' leadership behaviors--one who exhibits behaviors suggested here, the other who demonstrates none of them--see Guest (1962). The case study which occurred in and automotive factory is well-detailed and clearly written.

To summarize the paradigm: leaders function most effectively in organizations when they recognize and integrate the organization members who have personal and social needs requiring accommodation. Overall, this calls for leadership behaviors that are *supportive, emphasize goals, facilitate work and interaction.* At the same time leaders are always having to *make decisions.* The best decisions are made with the *open approach* of utilizing knowledge of organization members (resources); which, in turn, calls for the various forms of vertical and horizontal *communication* and the exercise of *influence*; both of which are immutably tied to, and enhanced by, all the above leader behaviors. In short, *this new view of leadership provides for integration and task effectiveness through information flow and utilization.*

PART III

Before proceeding it might be well to recall two major ideas that are part of the backbone of this paper. One has to do with the conceptual scheme for viewing the interaction of knowledge flow and organizations. The framework presents knowledge flow in three stages: entering, passing within, and exiting from the organization. A second major point was that organizations traditionally are built for constancy or a "steady state" in order to protect themselves from frequent changes which would challenge their integrity.

In the last section we sketched the major characteristics of the organization, characteristics which can "create" the certainty and orderliness of activities in the organization. Our next task--the one to be undertaken in this section--is to describe how these properties affect information or knowledge flow. First, message *entry* will be discussed; here we will see that knowledge flow is inhibited not only to preserve order but also to preserve the organization's sense of organizational identity differentiation from the environment. In the following unit, the transmission of information *through* the system, we will discuss the elements of the organization (e.g., division of labor, structure, training) that serve to impede information flow. The last part of this section will deal with the knowledge *exit* barriers in organizations.

A. Information Flow into the Organizations

Several writers have commented on the general impact of order and constancy on knowledge flow. Whitney (1950) mentioned that innovations threaten the dynamic equilibrium which characterizes the relationships of persons and groups, and since the advantages of accepting and utilizing knowledge may be outweighed by the disadvantages resulting from disturbing the equilibrium, the knowledge input may be blocked. Schon (1967), treating the entrance of knowledge into the organization as a function of the risk involved, states that the organization, by its very nature, is conservative. Menzel presents a similar position (1960), We shall now examine the specific impediments to which these researchers and others refer.

1. Coding scheme

A status quo cannot help but lead to parochialism which, in turn, reinforces the status quo. One common manifestation of this is jargon or language of an organization that is 1) primarily used by organization members, and 2) not understood by persons who are not organization members. Thus, words and phrases take on special meanings that are peculiar to a small group of persons.

Allen (1966, 1967), studying R & D labs, has found that members of an organization which requires loyalty and commitment tend to acquire common coding schemes or shared ways of ordering the things relevant to them. This comes from their common experience and exposure in the organization. Katz and Kahn (1966) refer to organizational coding schemes as a determinant of communication in that they distort, reject, accept, and transform what is said. Seashore (1967) offers similar arguments. He points out that a group establishes its own particular identity by enlarging its uniqueness. One way to do this, he states, is to define a vocabulary peculiar to the group.

A coding scheme serves to make communication with "outsiders" difficult (one might even think that this is its purpose). Accordingly, it is a barrier to information flow since there will be a lack of understanding between members of different organizations, especially if they are working in technical fields. Deutsch (1966), studying governmental organizations, recognized this difficulty and labelled it a "communication differential" between insiders and outsiders of the organization. Likert (1955), Campbell (1958), and Cartwright (1949) also discuss the effect of disparate coding schemes, although they do not call it such; nevertheless, their discussions are similar to those just presented.

2. Social relationships

Another information barrier engendered by a "steady state" is the existence of enduring patterns of social behavior in the organization. These patterns serve as barriers to knowledge entry, because a change suggested by new information may threaten to alter the social structure which organization members are used to and receive satisfaction. Our earlier discussion on the social nature and needs of the individual help us to understand why this is so. Although division of labor and role demands are impersonal and restrictive, the individual twists and reshapes his role behavior to be more compatible with his personal needs and interests, especially social ones. There is a sizable body of literature providing case after case of resistance to new knowledge entry, precisely because of its implication for change in social relationships (e.g., Steward, 1957; Lawrence, 1954; Schon, 1967). One author (Marcson, 1960) even contends that social structure is a critical variable for knowledge influx into a society.

3. Openness to outsiders

The boundaries of the organization which serve to separate it from its environment (e.g., buildings, dress, rules) also help to create organization myths designed to deal with the uncertainty and ambiguity of change brought on by new knowledge (Schon, 1967). One such myth is that all outsiders strive to deceive and undermine the organization in their dealings with it. Thus, knowledge from the outside can be seen as a threat to the consequence of a deliberate change, but also as a direct maligning of the organization and its members. The result is a lack of openness toward outsiders.

This myth of organizational threat is, of course, partly engendered by the high value put on competition and capitalism in our society. This does not necessarily mean that organizations sponsor secret agents to give rival organizations misleading information about techniques, services and products (although occasionally the newspapers testify to such occurrences). It does mean, however, that the organization is not totally rational and can manifest actual signs of psychopathological characteristics through the behavior of its members (Nokes, 1961; Mansfield, 1963). This impression that knowledge from outside sources is "tainted" serves as a basis for an attitude of distrust and of seclusiveness from others.

Carrying this point further, one writer talks about knowledge acceptance as, in part, a function of the psychological condition of the organization (Whitney, 1950). Specifically, researchers have found that one major barrier to information entry in communities (Lewis, 1955), in industry (Schon, 1967) and in government (Morrison, in Bennis, et al., 1962; Schon, 1963) is the readiness to distrust innovations and a generalized lack of interest in changing traditional ways of doing things.

4. Personal threat

Related to the fact that organization members suspect outsiders of planting erroneous information is the belief that outsiders will say or do something that will discredit an organization member. A case in point is a work by Newman (1958). He remarks that behavioral scientists are refused admittance to organizations by members who think whatever information the scientists generate will be an indication of member failure. This is partly true. New ideas may be indicative of past mistakes, since, over time, unchecked assumptions become uncontroverible facts so the threat value of new knowledge may be realistically and psychologically high. In general, we can say that members fear outsiders whose knowledge can be seen as a disparagment of their own abilities and performance.

5. Local pride

Almost all organizational theorists agree that to sustain the organization, members must have some degree of commitment and identification to it. This is part of the reciprocal expectations between the organization and its members discussed earlier. Moreover, the organization wants its members to perceive it as an attrative place to work; such an attitude not only keeps them in the organization but also aids in attracting new recruits. This identification or attachment engenders a spirit of pride in the organization. This can have an impeding effect on knowledge flow into the organization. This barrier, which we call "local price," is manifest in several ways.

One indication of organization attachment is the distrust of outsiders we spoke of earlier. Another is the belief that if knowledge relevant to the organization exists, it will come from members of the organization itself. They think that they are in the best position to know what is needed. Evidence for the barrier to information input engendered by local pride is provided in a study of scientists in R & D laboratories (Allen ,1966) and a study of administrators in business firms (President's Conference, 1957).

6. Status differences among organizations

Status discrepancies between organizations can create distrust and barriers to knowledge flow (Paul, 1955; Hoselitz, 1952). For example, Paul discusses the relative futility of the programs of medical organizations which try to reach a lower socioecnomic class due to the "status gap." Status differences do not block knowledge flow, per se; rather the fear of being judged inferior--on rational or irrational grounds--serves to inhibit the approach of a lower status organization toward another for information. It is easy to see that this barrier is self-perpetuating. The lack of knowledge of an organization can only be remedied by asking another for information. Yet, this act, in itself, is an admission of inadequacy and of failure when the other organization has succeeded so the lower status organization may be unwilling to seek new information (Rice, 1963).

It is reasonable to go further and postulate that the trust an organization has of another interacts with status differences to affect information dissemination. This has been shown to be true among superiors and subordinates in organizations (Mellinger, 1956).

7. Economic condition

The economic situation of an organization has a great deal to do with the knowledge it accepts and utilizes. If an organization has a very propitious financial situation, it can afford to seek out new and uncertain discoveries and innovations for experimentation (Lewis, 1955; Whitney, 1959; Mansfield, 1963).

However, being able to financially support innovations does not necessarily mean that the organization will be receptive to new knowledge. Several researchers have pointed out that an organization must feel some dissatisfaction with its present state before it can accept new knowledge (Schein & Bennis, 1965; Lippitt, et al., 1958; Schon, 1967). Thus a relatively profitable organization (this includes such organizations as schools with excellent reputations and no touble recruiting) may not be open to new knowledge if it does not perceive a need for it.

8. Training newcomers to accept the old ways

Many of the attitudes and operating assumptions of members are inculcated during organizational training (Schein, 1965, 1967; Haire, 1967). If an organization member is to be taught to trust--or distrust--outsiders, the first opportunity is at the beginning of his tenure. Therefore, training can be a potent instrument for affecting openness toward knowledge entry.

However, training is susceptible to the schizophrenic needs of the organization. In other words, even though survival may be predicted on the reception and utilization of innovations, the perceived threat of new knowledge to the quilibrium of the organizations (the threat of removing stable patterns and structures) often produces a training program that inculcates attitudes of "not rocking the boat" and maintaining the status quo (Schein, 1965, 1967). In this way, training serves to perpetuate existing conditions and to inhibit the entrance of knowledge a newcomer might seek in order to change the present conditions.

9. Size

What little research there is on the impact of organization size on information flow is consistent. Mansfield says that the larger organization is characterized by faster knowledge reception (1963). Markham (1965) concurs although he does note that in the very large organization this relation may reach an inflection point and decline.

B. Knowledge Flow Through the Organization

Having identified several elements which typically impede knowledge *entry*, we are not in a position to sketch some barriers to information passage *through* the organization. When new information has by some means entered the system, what factors may inhibit its dissemination within the system?

1. Division of labor

a. Coding scheme -- Each unit of the organization typically contributes in a unique way to the mission of the organization. For instance, one high school department teaches science, another physical education, a third shop courses, and so forth. A division of labor also means that the organization members of one unit and one unit alone share interests, experiences, problems, and to some extent, backgrounds (Landesberger, 1961; Seashore, 1967). Moreover, each unit like any group, tends to employ a unique vocabulary or coding scheme because of its common, specialized concerns and its natural desire to enlarge its uniqueness and cohesiveness (Seashore, 1967). This unique coding scheme tends to impair communication across groups. Jackson (1959), in fact, calls organizational subunits "subcultures" and states that "translation" of information is necessary between subunits. Also Katz and Kahn (1966) maintain a similar stance on knowledge transmission through the organization.

b. Competition -- Moreover, subunits of an organization typically compete for resources allocated by the top administrators. The competition stems from the fact that resources (e.g., money, manpower) available to any organization are limited, therefore, each subunit request cannot be completely filled (March & Simon, 1958; Landesberger, 1961; Schon, 1967). Schein, noting that competition among organization subunits usually occurs, states:

> It may be desirable to have work groups pitted against one another or to have departments become cohesive, loyal units even if interdepartmental coordination suffers. Other times, however, the negative consequences outweigh the gains and management seeks ways of reducing intergroup tension. The fundamental problem of intergroup competition is the conflict of goals and the breakdown of *interaction and communication* between the groups; this breakdown in turn stimulates perceptual distortion and mutual negative stereotyping (1965, p. 83).

Moreover, there are several studies in industrial setting--Walton, et al.(1966), Strauss (1962), Schon (1967)--which provide empirical evidence of the inhibitory effect of the division of labor on message flow within the organization. In short, competition can serve to separate subunits of the organization and impede information flow.

c. Norms -- Furthermore, the development of groups on the basis of specialization has significance for knowledge flow beyond differences in vocabulary and competition. Groups have norms, goals and values which require the adherence of all members. Moreover, the norms, goals, and values of a group are frequently at cross purposes with those of other groups within the organization (Dalton, 1959; Rome & Rome, 1963). Schein epitomizes the problem involved in the conflicting values and goals of groups when he discusses:

> a committe composed of representatives of various departments of the organization. Each person is likely to be so concerned about the group he came from, wishing to uphold its interests as its representative, that it becomes difficult for the members to become identified with the new committee (1965, p. 73).

To draw one implication, one way to inhibit information flow is to maintain a group norm of rejection of non-members' information. Yet, short of this direct way, group norms can operate in another way to block knowledge flow inside the organization. Rogers (1962) has summarized much evidence demonstrating that members who innovate, i.e., utilize new knowledge, are almost always departing from group norms and stabilized patterns of group behavior. Thus, the very existence of norms--inherent in every group--argues for the rejection of new information *unless* a norm to innovate and to utilize new knowledge is held by the group (Coleman, et al., 1966; Menzel, 1960).

Illustratively speaking, think of Dave Robbins and his colleagues who teach physics. They share a certain idiosyncratic vocabulary because of their similar backgrounds and interests and because they are good friends (coding *scheme*). They feel slight antipathy toward the biology-zoology teachers because they, too, have a peculiar coding scheme and are hard to communicate with; also they received the major portion of the science divisions' funds for new equipment (intergroup competition). The physics teachers established a norm of giving tests at the same time during the school semester so physics students could study together if they wished (norms). Several biology-zoology teachers have mentioned to Dave Robbins that they think this policy is a poor one and have given some reasons why they think so. If you were Dave would you accept their messages? We think not.

2. Roles

The influence of stipulated behavior patterns on knowledge flow through the organization can be covered briefly. If a role demand calls for information transmission among organization members, then a formal channel for knowledge flow has been established. If no such role demand is made, then, unless members take it upon themselves to send and receive information, knowledge flow does not occur between those members.

Recall, though, from our earlier discussions that what other persons expect an organization member to do may not be what he actually does. To summarize, rather than repeat what has been said so far, we quote an organization researcher: "Role functions are variously distorted by personal ties and sentiments. Clique actions, both the functional and the corrective, strain formal roles in protecting them and in creating new roles" (Dalton, 1959, p. 256). Thus, although organizational role demands supply the formal linkages for knowledge flow in an organization, social and functional needs (e.g., information overload) can alter the prescribed flow. To review, inhibition of flow occurs when roles are not formally defined with the necessary intermember linkage or, if channels are defined into the roles, when social purposes (e.g., pride, lack of trust) or other motives came into play.

3. Structure

Several properties of the structure of the organization influence information flow through the organization. The structural properties we will cover here are hierarchy, control span, distance, decentralization, linkage, and size.

a. Hieararchy and differential status -- One of the most important variables influencing knowledge transmission in the organization is status. Status is derived from many sources: authority, prestige, control over others, and responsibility are a few. All of these variables are associated with differential positions in the organization hierarchy. Burns and Stalker (1961) studied several industrial organizations and found that they were practically immobilized by their stress on the importance of the hierarchical status system and by the resistance of members to changing the structure. They discovered that organization members would not accept a new department or utilize new knowledge and findings out of fear of depreciating their own personal status. Gerard (1957) and Cohen (1958) working with experimentally created hierarchical groups, Kelley (1951) and Read (1962) in industrial organizations, and Allen (1966) and A. Frohman (1968) in R & D labs, cite instances of bariiers to communication because of status discrepancies. Jackson in an article on general communication problems in organizations cits status as a major structural barrier (1959). Larson and Hill (1958) and Barnlund and Harland (1963) mention that information flow is much freer when a social structure, i.e., status hierarchy, is not in place. The former studied groups of boys in a summer camp; the latter, sororities on a midwestern campus.

Another author, discussing organization change in elementary schools, states that when an organization divides into a hierarchical structure, "progressive segregation" occurs. He goes on to state: "the more hierarchical the structure of an organization the less the prossibility of change" (Griffiths, 1964, p. 434). Maier, et al. (1961) in several industrial settings, Blau (1954) in a governement agency, and others have also noted the impeding effect of hierarchical structure on communication.

The basic and critical reason for the effect of status on communication is, simply, a person with great status typically holds power to portion out rewards; he is instrumental to the need satisfactions of lower status organization members. Thus members are very hesitant to pass along knowledge unless it is: 1) firmly substantiated--which in the case of innovations or new knowledge is often hard to do (Schon, 1967); 2) reflective of only a positive evaluation of themselves (Read, 1962; Jackson, 1959; Festinger, 1950); and 3) directly relevant to the receiver.

b. Span of control -- Another means of providing structure is the control span. The span of control affects information flow primarily in terms of the number of relationships an administrator supervises. "While the addition of individuals to a group is an arithmetic function, the increase in number of relationships between individuals is geometric. Hence the number of relationships increases very rapidly with only small increments in the span of control" (Barrett & Tannenbaum, 1968, p. 5). Thus, as the control span increases, on the one hand, the number of potential receivers *in* the groups rises rapidly. On the other hand, however, intergroup flow is inhibited for several reasons: 1) as the number of potential receivers and senders within the group increases the relative importance of intergroup flow decreases, and 2) competition among groups becomes more intense as groups grow larger (Schein, 1965).

c. Decentralization -- A fourth structrual feature, decentralization, offers increased capacity for knowledge flow and utilization among the members of the decentralized unit (Griffiths, 1964; Katz & Kahn, 1966). However, decentralization can hamper dissemination between parts of the organization. For example, the decentralized units and the organization headquarters may not have adequate message flow because the subunit may perceive itself as self-sufficient or the headquarters does not want to "interfere" (Likert, 1961; Rice, 1963).

d. Linkage -- The next structural characteristic we will consider here is linkage. The linkage or reporting network in an organization is a function of role demands since role demands, in fact, define the formal reporting network.* Logically, the fewer the formal number of channels among the organization members, other things equal, the smaller is the possibility of knowledge dissemination and utilization. Davis (1953) cites a case where a department of an industrial organization did not frequently have vital information merely because no formal links to it were defined.

4. Compensation

The patterns of compensation and rewards have a definite impact on the member's behavior. Typically he is rewarded for stable, dependable behavior (Rothe, 1960). Katz and Kahn state: "The man of the assembly line, the nurse in the hospital, the teacher in the elementary school all know what their major job is. To do a lot of it and to do it well are the most conspicuous behavioral requirements of the organization" (1967, p. 338). Thus, the typical organization member is rewarded for not "rocking the boat," for functioning in a reliable, habitual way--a way that is not at all a facilitator of new knowledge flow or utilization through the organization since new knowledge threatens to "rock the boat" and endanger the status quo.

However, this pattern is not true of all organizations, or for all members of an organization. The organization *must* innovate and must utilize knowledge. Therefore, *some* rewards for knowledge dissemination and utilization in the organization are in order. However, few writers have yet acknowledged the importance of providing rewards for facilitating knowledge flow throughout the organization.

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*We discussed earlier the fact that role demands are not always fulfilled and are often supplemented. That earlier discussion is relevant here also.

One other point should be made with regard to compensation. Jackson (1959) notes that rewards must be perceived as equitably distributed; otherwise the perception of unfairness serves as a barrier to knowledge flow through the organization.

5. Training

Each subunit of an organization does some training of its new members beyond that provided by the organization as a whole. As well as becoming acclimated to the organization, it is necessary for a new member to become familiar with the ins and outs of the group or department he works in. Thus just as training at the organizational level affects knowledge flow *into* the organization, training at the group level affects flow *through* the organization.

In-group training includes learning the procedures, policies, norms and values of the group. Some of the training may be related to the task performance, other parts may not be (Schein, 1967). Customarily the training does serve to "socialize" the new member into the group so that his allegiance and identification is with that group and not others. This involves generating pride and loyalty and concomitantly raises the same problems for knowledge flow covered under the "division of labor."

6. Separation of members

Distance between organization members and between groups has often been pointed to as a determinant of information exchange. For insantce, Gullahorn (1952) found that distance was the most important factor in determining interaction between employees in an office. Other researchers found distance a major factor in the information flow among groups in a housing project (Festinger, et al., 1963), in the military (Caplow, 1946), in a large factory (Davis, 1953), and among sorority hourses (Barnlund & Harland, 1963) among others.

However, one must keep in mind that the status structure is another major determinant of information flow. Since higher status groups tend to receive more messages than lower status groups (Kelly, 1951; Cohen, 1958;

Allen, 1966), it may be that the differential effect of status interacts with distance between organizational groups and members in determining the amount of message transmission. There is some supoort for this notion of status and distance interaction in Guetzkow (1965) and Barnlund and Harland (1963).

7. Leadership behavior

We will not discuss in detail the influences exerted by leadership on information transmission since leadership was covered earlier at some length. As noted earlier, leadership behaviors serve both as stimulus and as a model for much behvior in the organization (Bowers & Seashore, 1966). Therefore, they are major determinants of barriers to information flow and usage.

To look at leadership behavior as a stimulus, we can consider the impact of an administrator telling his subordinates that all communication must be written and submitted to him before it can be passed along to anyone outside the group. Another example is the administrator who impedes information exchange between his subordinates and everyone else in the organization by emphasizing the independence and self-control of the group.

A case study of an automotive manufacturing plant by Guest (1962) is a fine example of the effect of modeling on knowledge flow within the organization. The study showed that a plant manager did very little to facilitate vertical flow between himself and his subordinates. As a consequence, Guest found that there was little information flow either vertically or horizontally throughout the organization.

C. Knowledge Flow Out of the Organization

Having covered factors that can impede knowledge entry and flow through the organization, it is appropriate to touch on some major factors that inhibit knowledge transmission *out* of the organization. There are two potent factors influencing knowledge exit. First, the objectives of the organization, and second, competition among organizations.

1. Organization goals

Most organizations do not envision as their primary purpose the transmission of new information into the environment. This, of course, is not true for all organizations (e.g., R & D. labs, extension services and foundations); however, this organizational fact of life does hold for the majority.

This is not to say that organizations do not generate knowledge. In fact, the opposite is more accurate. However, the information generated is primarily relevant to the particular activities and functions of the organization; specifically the information serves to monitor and regulate the operation of the system, or feedback. In other words, as producer and recipient of information about its own activities, an organization serves as both the resource and user system. In some instances an organization may send information to an external agent in order to receive an opinion of analysis of the internal functioning, however, the purpose is, once again, feedback for the organization. Some examples are the sending out of a new product for the testing of its market potential or releasing information of its structure to a consultant for purposes of organizational improvement.

As we said earlier, some organizations do purposefully transmit knowledge out to other organizations. However, these can be split into two types; those who market the knowledge (.e.g, R & D organizations) and those who provide a service (e.g., government agencies and extension services). For the former the barriers are primarily the same ones inhibiting knowledge flow through the organization since the major difficulty in knowledge output is in the internal dynamics of the organization; itsefl (see Allen, 1966; A. Frohman, 1968; Pelz & Andrews, 1966). For the latter, assuming that knowledge is in hand, the major problem is one of dissemination.

Before exploring some specific factors inhibiting dissemination from the service organizations, it will be useful to mention the other major obstacle to general knowledge diffusion by organizations.

2. Competition

In the second section of this paper we mentioned that organizations must innovate if they are to survive in our rapidly changing society; in order to innovate they must not only utilize new knowledge from outside but also must generate knowledge--other than feedback--inside. The former is covered under the area of knowledge input; the latter is relevant here.

If we assume that organizations do produce new knowledge, the question becomes one of determining why and for what period of time the innovations are kept secret. The answer is probably obvious. In a capitalistic society where intra-industry competition for markets and members is the rule rather than the exception, survival is, to a large extent, dependent on staying up with competitors if not ahead of them. One well-known example of this secrecy is the automotive manufacturers who go to great lengths to conceal new model cars and automotive improvements. Another illustration is the contractual obligation of some organization members not to reveal certain ideas and procedures if they are hired away by rival organizations. In short, it is presumed to be harmful to the organization to have its new ideas an innovations indiscriminately diffused.

However, innovations are not hidden for an indeterminant period of time. Rather, when the market is ripe, they are made visible as purchasable products. For example, automotive improvements such as safety features and engineering advances are introduced when there is a demand for them. (The demand may emerge from many sources.) This means that, at present, the automotive industry is capable of introducing innovations that, for one reason or another, it has not done yet. In short, the manufacturers are very selective in screening and packaging the information which it allows to exit.

3. Remoteness

Returning to the organizations that are in the business of disseminating knowledge, we can identify several knowledge output barriers. One such barrier is remoteness or lack of linkage. Remoteness refers to the number and variety of contacts the disseminating organization has with other organizations. Logically, the greater the number of contacts with an organization and the greater the variety of organizations linked, the greater is the possibility of knowledge dissemination.

The potential for linkage is greatly enhanced by the visibility of the organization and vice versa. As the number of connections a disseminating organization has to other organizations (user systems) increase, the ease of its being seen increases. Moreover, visibility increases exponentially with the number or variety of contacts. After one organization is effectively linked to a disseminating system, it may inform other organizations of the resources thereby making them potential user systems (Lippitt, et al., 1958).

Before turning to another barrier of knowledge exit, we should look at the effect of the number of contacts with a user organization. Although some people maintain that one contact person within an organization is sufficient, there are some counter arguments as well. First of all, if one contact is to work, it must be with the key person in the user organization; the person who can champion the new knowledge and get it accepted and implemented by others.* Often, however, it is very difficult to pick out this key person. Secondly, Menzel (1966) cogently argues that the adoption of new knowledge is based on multiple inputs about it. One notice or transmission about the new knowledge is insufficient; rather several separate transmissions, all converging to produce a "synergistic" effect on the user organization is necessary. Essentially, this serves to point out the usefulness of redundancy, something certainly characterizing our everyday conversations (Campbell, 1958).

4. Coding scheme and adaptive transmission

Another obstacle to the flow of knowledge out of an organization is the lauguage or jargon the disseminating system uses. Since this notion of coding scheme or jargon as a barrier to knowledge flow has been presented elsewhere in this paper, we will not dwell on it. Suffice it to say that if due to strange terms or phrases the potential user cannot easily understand what the disseminating organization is trying to communicate, then the dissemination will probably fail.

The coding scheme problem is often inherent in the different tasks and interests of organizations. However, it also may be indicative of another more global barrier to knowledge transfer; the unawareness or inability to present new information in such a way that it can be easily understood and used. All too often, diffusion efforts fail because the resource organization assumes that the recipient has interests, values and perspectives very much like its own (Likert, 1955). Consequently, no attention is paid to interpersonal, social or cultural factors. Unfortunately, the literature is replete with illustrations.

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*Schon calls this person a "product champion" and examines his role in detail (1963, 1967).

Sasaki (1956) and the Task Force on Indian Affairs (1962) discuss the failure of government agencies to consider the social and cultural values of the American Indian and relate this to the lack of success of assistance projects. The work of Simmons (1965) in Iraq, Lewis (1955) in Mexico, and Murase (1955) in Japan indicates that the omission of social factors in planning knowledge input is not limited to the United States. They relate that argricultural and medical improvement programs started by the governments failed for the same reason. Moreover, even when a resource and user organization have more in common than the above examples, as in the case of a consulting firm and in a school system or industrial plant, the values, perspectives and social factors must still be considered (Lippitt, et al., 1958; Bennis, et al., 1962).

In sum, knowledge transmission which singularly concentrates on giving the technical information or innovation and does not adapt to the social and cultural forces of the recipient, has a poor chance of being utilized.

5. Status differences

The perception of a status discrepancy may hinder the passage of knowledge from a disseminating organization to a potential user. The impediment we refer to here stems from the perceptions of the resource organization, not the user.* It has been mentioned in the literature that a status quo often exists between the resource and ther user organization (Paul, 1963; Bose, 1963). If a status discrepancy is salient to the resource organization, it seems reasonable to postulate that one effect of this disparity is to reduce the effectiveness of the diffusion efforts. For example, a reknown government health service, asked to work with a small, rural community, may not pay as much attention to their efforts as they would when invited into a socioeconomically prestigeious community.

PART IV

FACILITATING ORGANIZATIONAL KNOWLEDGE FLOW

We have seen that the organization must maintain a stability of functioning to survive and that the mechanisms it employs for this purpose can do an admirable job. We have also taken note that the organization must selectively facilitate knowledge flow and utilization to survive in our rapidly changing society. Having just enumerated the barriers to knowledge dissemination and utilization organizational context, it is appropriate to turn to some mechanisms the organization uses to overcome such barriers.

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*The perception of differential status by the recipient and its effects are included in information flow into the organization.

A. Overcoming Organization Barriers to Information Input

Environmental changes such as competition and increasing prices on labor and materials compel the organization to overcome its insistence on preserving the status quo and force it to seek out new ideas. We will now turn our attention to some of the mechanisms which *facilitate* new inputs.

1. Appeal to profit or reward value

The profitability of discovering knowledge relevant to the organization is perhaps the most fundamental motive on which innovations are sought. The profitability of an investment opportunity acts as a stimulus, the intensity of which governs quite closely the organization's speed of response (Mansfield, 1963). To mention another researcher, Newman (1958) talks about fear of profit loss as a motivating factor in seeking out and utilizing new ideas. Thus, the predisposition to obtain knowledge from outside the organization seems to be based on a simple equation of:

$$\text{Income} - \text{Expenses} = \text{Profit or Loss.}$$

Profit can be and often is invoked as the reason to receive and utilize knowledge but, by itself, it does not succeed in obtaining new knowledge. This is left to various mechanisms and manipulations the organization has at its disposal. It is these we will now review.

2. Change chief administrator

One author states that the number of innovations is inversely proportional to the tenure of the chief administrator (Griffiths, 1964). This means that a new leader brings new knowledge and perspectives and comcomitantly, a commitment to new ways of doing things. This often serves to prompt a shake-up in the organization so that the knowledge and policies of the new leader can be adopted and adjusted to.

Another way to change the governing power of the organization is to merge the organization with another. Marrow, Bowers and Seashore (1967) elaborate one such occurrence. They describe in detail the purchase of one organization by another and the resulting infusion of new technical and social knowledge and applications. They find that the "changing-of-the-guard," not only allows for new ideas at the top of the organization but also prepares the rest of the organization psychologically for the general changes which are to follow.

Prior location and position of the new chief are major conditioning variables on the amount of new knowledge utilization he is likely to evoke. Carlson (1965) found that the amount of change occurring when a new school superintendent takes over is greater when he comes from *outside* the school system. Griffiths also mentions the effect of the prior location: "Change in an organization is more probable if the successor to the chief administrator is from outside the organization, than if he is from inside the organization" (1964, p. 433).

3. Perception of crisis

The perception of great difficulty in the organization usually results in a hurried search for help from outside. Thus a crisis can stimulate knowledge flow into the organization. In fact, to some theorists the changing of the top leader is perceived to be a crisis. Etzioni states:

> the departure or death of the non-bureaucratic head of an organization...involves a major organization crisis. The succession crisis is particularly evident in totalitarian states, and almost invariably leads to a period of instability. But corporations, churches, armies and other organizations are also subject to similar crises (1964, p. 55).

A leadership change does not necessarily produce a crisis in the full sense of the word, however. Etzioni also states:

> The succession crisis should not be viewed as a mere loss of organizational effectiveness, a crisis from which the organization has to recover. Actually the succession period is often the stage at which needed innovations are introduced to counteract earlier deterioration of the organization or to ward off challenges it faces during the succession period (1964, p. 56).

Schon discusses the relevance of crisis perception for knowledge entry in some detail. His reasoning is that:

> In individuals and organizations it is easy to underestimate the strength of the dynamisms that tend to keep things as they are. Only the strongest incentives can lead an organization to effective deliberate change... . Something like a state of crisis must arise. The organization must come to feel that its survival, or at any rate, its survival as it has been, is threatened. Characteristically this perception of threat comes from the outside... . Once it perceives the threat, the organization must immediately interpret it as requiring a shift toward innovation (1967, p. 127).

To this point Schon refers to a real crisis, one that truly threatens the existence of the organization, but "crises" do not have to be real in order to have their instigating effect. Elaborating this view, Schon says: "One of the characteristics of managers capable of inducing deliberate internal change toward innovation is the ability to *create* a sense of crisis around events that need not be interpreted in this way" (1967, p. 127). This is congruent with other writings which maintain that the organization, for whatever reason, must *feel* discomfort or pain before new knowledge will be sought and utilized (Schein & Bennis, 1965; Lippitt, et al., 1958).

In this context we take special note of the education system which is in the peculiar position of being influenced by difficulties within its system as well as in society as a whole. Miles (1964) reasons that the increasing influx and utilization of innovations in schools has been in part prompted by the "struggle for national survival" started by Sputnik and the growing demand for highly trained employees.

4. Examining other organizations

The organization can facilitate knowledge entry by sending a member to procure new knowledge from other relevant organizations. There are several forms the outside assignments can take, all of which may be considered types of training.

Quite often the organization will offer to pay for a member's further education outside the organization if it is relevant to the organization. (Sometimes it need not even be relevant to the organization, but this is less frequent.) The operating assumption is that a course taken outside the organization will benefit the member in his functioning in the organization.

Formal academic courses are not the only ones useful to the organization. Conferences, seminars, professional meetings and conventions often contain knowledge inputs that are of great utility to organizations. Carter (1966) writes that conferences on educational innovations proved to be very useful to schools sending representatives. Since the utility of supporting the organization member's outside education is obvious enough, it need not require belaboring here.

Another way of searching for outside resources useful to specific organizational goals is visits (Brickell, 1963). Governments from the national to the local level utilize this procedure frequently to check what other governmental bodies can teach them. Visitation can serve two purposes: 1) to determine what knowledge the visited organization has, and 2) to observe a "live" demonstration of the usefulness of information which has been received "at home" (Lippitt, 1958).

5. Training

As noted earlier, organizational training is a potent means for encouraging or discouraging knowledge flow. Several researchers have elucidated this point specifically in the context of facilitating information input (Brickell, 1963; Schein, 1967). Also a President's Conference for small businesses (1957) mentioned that in order to make business firms recognize and seek out new knowledge, the leaders should be trained in the importance of outside research activities. Supporting this view with empirical data from several hundred industrial firms, Mansfield (1963) found that the training of top and middle managers is one of the key variables determining the rate of introduction of innovations. In fact, it may be more important, he says, than the so-called economic variables.

One other point that should be made is that training is inextricably bound up in other factors that may facilitate knowledge entry. Crisis perception, linkage and administrative changes are a few of the factors that may either be an antecedent or a consequence of training. Generally speaking, training that is institutionalized, i.e., a conventional part of the organizational routine, is what we have reference to here. Its importance should not be reduced by consideration of other, more spontaneous, occurrences.

6. Capacity

Earlier it was mentioned that the reward value of innovation is a major incentive to facilitating information entry. It is also true that the ability of an organization to retrieve and marshall diverse resources influences knowledge entry (Deutsch, 1966). In an empirical study of a university library Meier (1963) documented the fact that the capability of utilizing new knowledge (both literally and figuratively) depends on the internal structure and mobility of the library staff. Meier goes on to present many types of adjustments libraries can make to more adequately handle information overload presented by the publication explosion. The important point he makes for us is that some of the adjustments involved restructuring of linkages within the library.

Wealth of an organization is also an element of capacity. A President's Conference (1957) disclosed that small business organizations with a sizeable amount of financial reserves are more apt to invest in new knowledge utilization than organizations without a strong financial picture. Following up this line of thought, the conference concluded that the availability of long-term loans is critical for small businesses to be able to seek out and utilize new research knowledge.

7. External agent

Another way by which knowledge entry is facilitated is the bringing in of an outside agent. Because some of the theoretical and empirical aspects of external agents and resource systems are covered in other places in this paper, we will mention some major features and dangers of an external *agent-user system relationship.*

When an external agent attempts to diffuse knowledge, it must take into consideration several elements in its relationship with another organization: the goals of the recipient, social and political factors affecting the recipient, and the type of role it plays (A. Frohman, 1969a; Lippitt, 1958). First of all, the resource system must be familiar with the goals of the user system so that the information it provides will be in line with the needs of the recipient. For example, if a university group is called into an organization, it must be clear if it is expected to give technical assistance or do research (A. Frohman, 1969a). Another instance is when the general goals of the recipient are not understood; for example, when a school, which is testing new curriculum materials in severals classes for the school system, is told that inequitable teaching impairs the education of some of the students subjected to it.

The importance of social, political and cultural factors was covered earlier, therefore, we will make just one note here. Political and cultural values of an organization are engendered in part by the environment, i.e., other organizations (Selznick, 1957). Thus to be most effective in introducing knowledge, the impact of the environment on a recipient should be examined to judge whether it will reinforce or negate the new knowledge (Lippitt, et al., 1958; A. Frohman, 1969a).

The relationship of the sender and receiver can take many forms and is inextricably tied to the success of information input. One way to view the range of relationships is to characterize the extremes. On one side there is the collaborative model where both parties actively engage in examining the issue in question and exchange information and ideas; on the other side is the buyer-seller model where the resource organization occupies the role of expert "information giver" and the recipient blindly accepts it (A. Frohman, 1969a; Tilles, 1961). Both extremes have been subjected to research and the collaborative model seems to be most conducive to successful information flow from an external agent to another organization (Bennis, 1966; A. Frohman, 1969a; Lippitt, et al., 1958; Tilles, 1961).

8. Organizational invaders

An outsider does not always offer advice to an organization. In fact, quite frequently external organizations will "invade" less advanced organizations and, in part, take them over by virtue of their superior knowledge.. Schon (1967) cogently argues that knowledge entry is indeed difficult because of the organizational insistence on preserving an unchanging system. As a result, new or foreign or dynamic organizations will enter the market and industry already in place and proceed to reap the financial benefits of their new ideas and innovations. To illustrate this invasion of an organization from one field to another, consider the movement of new technical firms into the educational area, the chemical firms into apparel manufacturing, and the aerospace organizations into old-line industrial firms.

9. Greater inclusion

Another way for a system to increase the infusion of knowledge would be to hire the persons who possess the expertise and competence it needed. This is an example of greater inclusion which facilitates knowledge entry by bringing into the organization the person(s) holding the knowledge. This, of course, is one of many reasons why an organization will purchase or merge with another.

One theorist uses the term "cooptation" to designate this process of absorbing new members into the organization in order to preserve or enhance its functioning (Selznick, in Rubenstein & Haberstroh, 1966). Selznick differentiates two forms of coopation. One is the inclusion of others in order to establish legitimacy of authority over them (formal coopation). The other type, informal cooptation, occurs when the organization needs certain adjustments that the new members can execute. It is the latter form we are referring to here. Cooptation, or greater inclusion, may be regarded as a means of *increasing information by increasing membership.*

10. Internal knowledge seeking subunits

By combining the preceding two knowledge entry facilitators, external agents and greater inclusion, we arrive at another means of increasing the ease of knowledge entry, an organizational subunit whose aim is to seek out and collect knowledge.*

The subunit that searches the environment of the organization for relevant new knowledge may be a library unit (Knoerr, 1963), a memory bank (Veyette, 1962), a planning unit (Katz & Kahn, 1966), a systemic research or development unit. In some cases the unit may just collect already existing knowledge available from other sources; in other cases it may actually do research in order to generate new information necessary to the organization. For the latter case Katz and Kahn offer the example of oil companies with foreign markets which "have economists and political experts on their staffs to study the development of the European Common Market, social forces in the developing African nations, and similar problems" (1966, p. 251).

An important issue with regard to internal information subunits is location of the unit, i.e., where in the organization hierarchy it is situated. Katz and Kahn propose that such a unit should ideally report directly to the top administrators in the organization because the strategic decisions are made at that level and accessibility to information is crucial for such decisions. Location near the top also denotes a status befitting the vital character of the information collection function.

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*The mechanism probably can be categorized under facilitators of information flow through the organization as well.

11. Professionalism

Another means by which knowledge input can be facilitated is increased professional affiliation or identity. An organization member with strong professional ties is more likely to be interested in applying and advancing his profession. In many cases, his organizational commitment may be less important to him than his desire to actively pursue interests in his chosen specialty field. For example, a research chemist for a fabric company may be more eager to synthesize a new organic compound--a feat esteemed by his professional colleagues --than to study the properties of a compound that his organization already has started to develop.

As in the above illustration, professional commitment may have a deleterious effect on the organization. However, in most cases the proper balance can be struck.* Usually organizational functioning is enhanced by the knowledge entry increment which is associated with active professionalism. Increased professional striving brings with it a greater striving to "keep up" with what outside colleagues are doing. The greater knowledge which results may very well be beneficial to the organizational activities the person is engaged in.

Utilizing this theme Kimbrough (1965) advocates greater professionalism among educators. He maintains that often teachers and principals do not try to improve the curriculum because they perceive themselves to be in a "poor" school system. Kimbrough then points out that this attitude as well as perceived inadequacies in the school system can be ameliorated by greater professionalism which would lead to being active in the field and familiarization with educational research literature. By doing this they then have a vehicle by which to assert their leadership and overcome barriers to needed change.

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*To mention one body of research, Pelz and Andrews (1966) and A. Frohman (1968) found that Ph.D. research scientists preferred autonomy and little supervision whereas non-Ph.D. scientists desired greater direction and less freedom; also the former had stronger professional ties than the latter. Consequently, it was suggested that Ph.D. scientists perform the exploratory, innovative work on research projects and non-Ph.D.s be responsible for the follow-up development work (Frohman, 1968).

An important point is that the granting of autonomy and freedom to subordinates is not always desirable--some organization members may prefer close supervision and little responsibility. Other research bears this out (Vroom, 1960; Vroom & Mann, 1963). The resolution lies in the balance of assigning tasks and supervising according to ability and interest.

B. Overcoming Barriers to Knowledge Flow Through the Organization

Just as it is imperative to receive messages and new ideas from outside it is also critical to transmit ideas and information through the organization. To state the obvious, it is not enough for one organization member to have an idea, he must relay it to others and have them cooperate in testing its utility. We have discussed in some detail the organizational features that may inhibit the process of information dissemination through the organization. It is now appropriate to enumerate some ways by which the flow *through* the organization is encouraged.

1. Leadership

The potential impact of different administrative styles on organizational knowledge flow is probably obvious. An administrator can: 1) exhort his subordinates to seek out more information from other subunits, 2) direct subordinates to use understandable terms when communicating with others (Lawrence, 1954), 3) amend role demands so that his subordinates are functionally more interdependent, 4) manipulate rewards to favor knowledge flow among subunits, 5) train subordinates to value and utilize knowledge from other subunits, and 6) create structural modifications to stimulate information passage by greater numbers of linkages and channels.

How he goes about masterminding these mechanisms of communication facilitation is dependent on what the situation calls for and his repertoire of leadership skills. An organization leader emphasizing the interaction facilitation dimension may use 3), 5), and 6); work facilitation--1), 3), 4), and 6); skill at being supportive--5) and 6); goal emphasis--2) and 4). Probably some skill-mix of these leadership dimensions will best promote message flow. Further, consistent with our earlier discussion, a reliance on directive, authoritative leadership behavior will probably not have as productive an effect, especially over a long period of time (Likert & Seashore, 1963). With this perspective--granting that a superior has much potency in facilitating knowledge flow--we can turn to an examination of other mechanisms.

2. Training

Teaching an organization member to value innovative behavior and information exchange is a potent way to facilitate knowledge flow. Moreover, there are several fairly successful programs by which this can be done. Three of the better known programs are: 1) the Grid program, 2) Survey and Feedback, and 3) Sensitivity Training.

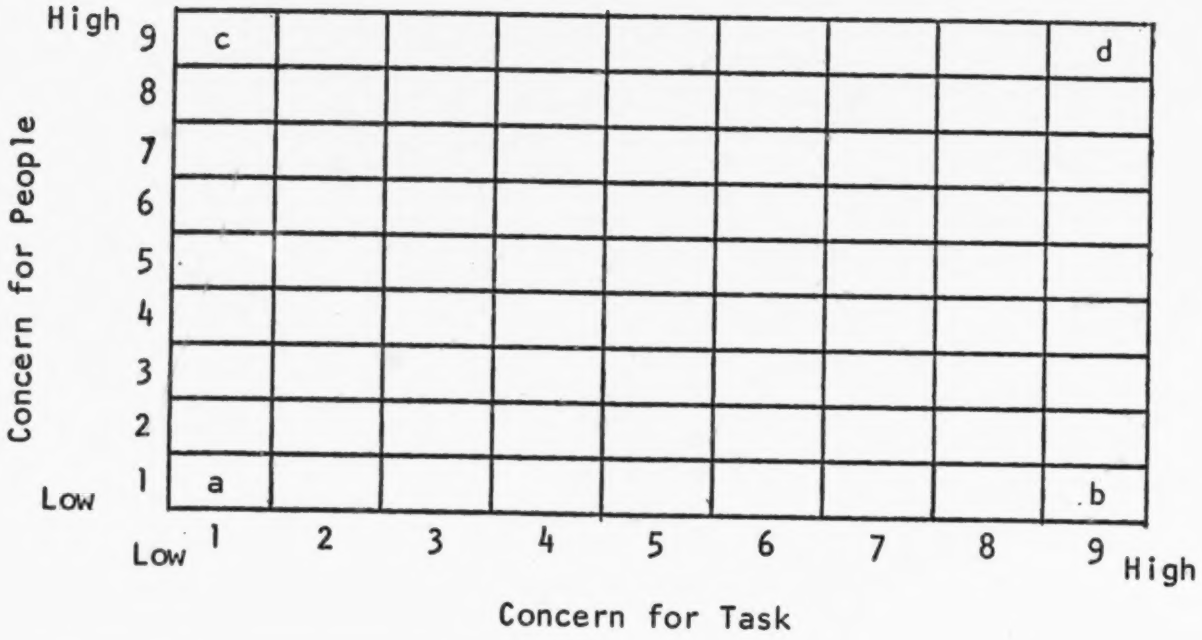
a. Grid -- The Grid is a training program created and promulgated by Blake and Mouton (1964). It emphasizes the importance of interpersonal relations and of task performance as the independent and major contributors to organizational effectiveness. The goal of the Grid is to change patterns of relationships among organization members and groups so that more effective problem-solving and decision-making can occur throughout the entire organization. The term "grid" comes from a diagram Blake and Mouton use to depict types of leadership styles.

The objective of the program is to train "9,9" leaders, i.e., leaders who show high concern both for their subordinates as social beings and for organizational performance. These leaders, in particular, try to encourage and plan for increased information flow (Blake & Mouton, 1964).

There are six phases of the training program. The first phase is a behavioral science "laboratory" where general problems and concepts of interpersonal relationships are discussed. The second consists of team training where members of organization subunits work together to apply the behavioral science knowledge to their own group. Problems of knowledge flow, influence, decision-making, and authority are among those handled. The third phase concentrates on improving information flow among subunits of the organization, i.e., linking among groups. Thus, intergroup problems are surfaced and processed. Fourth is the establishment of new goals for the organization and its subunits. The fifth step is implementation of planned change toward new goals. In the sixth and final phase, stabilization and review occurs.

Figure 3

THE GRID



Assumptions of Management Styles:

a. 1,1 management = exertion of minimum effort to get work done and little concern for people

b. 9,1 management = organization efficiency obtained by working conditions that are structured so that human elements interfere to a minimum

c. 1,9 management = thorough attention to social needs of people leads to a comfortable, friendly organization climate and work tempo

d. 9,9 management = organization performance best when members are involved in the activities of the organization and feel committed to it. Members interdependence and common goals create relationships of trust and respect.

b. Survey feedback -- The survey feedback method consists of several steps: 1) surveying the members of an organization on numerous aspects of organizational activities and properties in a systematic way, and, collating the information; 2) returning it to the organization in such a way to stimulate discussion and subsequent action. It has been used numerous times in various organizations and with some success (Buckhard, 1967; Mann & Likert, 1952; Mann, 1957). Basically data on the organization are obtained from the organization members by questionnaires or interviews.

The persons conducting the effort then synthesize the information to determine, among other things, the central weaknesses and strengths of the organization. This knowledge from the survey is then summarized so all respondents are anonymous and fed back to the organization through group meetings and discussions (Mann, 1957; Beckhard, 1967).

Survey feedback, as a means to collect information from individual members and to disseminate it throughout the organization, typically serves as a new mechanism for information retrieval and sharing on a multitude of organizational issues. By utilizing appropriate statistical and procedural methods, the social scientist-change agent can make sure that the information collected is valid and representative of the groups in the organization.

This training method usually does not stop with feedback of the compiled information. To facilitate the utilization of the survey findings a plan for each organizational subunit to discuss the survey results is customarily developed (Mann, 1957; Mann & Likert, 1952). This plan typically starts with returning the survey results to the top team of the organization. After they have discussed the information and determined how to use it, the subordinates in the team discuss the survey results with the separate task groups which each one of them supervises. These newly involved subordinates, after working with the survey results, hold group meetings in turn with the units they supervise. This procedure can be repeated all the way down the line.

The survey data feedback and discussions can: 1) identify general problems in the organization and in different subunits, 2) make organization members aware of the problems, 3) help identify the causes of weaknesses, 4) create an environment for discussion of the deficiences reported in the survey, and 5) facilitate finding solutions for weaknesses. Likert (1961, 1967) has also suggested that a well-constructed survey instrument can detect the presence of a problem before it reachers major proportions. He recommends institutionalizing periodic surveys to facilitate knowledge flow and discussion of the internal conditions of the organization.

c. Sensitivity Training: The "T-group" -- T-groups have become almost a fad in some organizations. Their genesis was based on the need to combine the relevant learnings from different areas of science about people and put them into a vehicle that made the learnings easy to understand and to apply (Bradford, Gibb & Benne, 1964). T-group training is primarily designed to help participants more fully realize their own potential for improvement and to enhance their ability to work with others. Basic to this training in organizations is the belief that the development of effective teamwork is, at the very least, a prerequisite of organizational improvement. This does not mean that the focus is solely on group processes; rather, there can be multiple foci: self-insight, interpersonal relationships, group processes, the characteristics and properties of organization, and the dynamics of change.

T-groups can be conducted in many different ways, although some common elements have been identified (Bradford, et al., 1964; Schein & Bennis, 1965). T-groups are usually unstructured with regard to agenda, goals, leaders, and even length, in order to facilitate learning. Willingness to induge in self-inquiry and experimentation is encouraged by relative freedom to do and say what one wants. The leader or trainer of a T-group behaves passively, taking a "permissive, nonauthoritarin, and sometimes almost completely nonparticipating role. By refusing authority, the leader thus presumably encourages group members to define and solve their own problems" (Leavitt, 1965, p. 1155). Significantly, one of the reasons for this passivity of the trainer is directly related to knowledge flow. Bennis and Shepard point out that one of the principal obstacles to valid communication is *orientation toward authority* (Bennis, et al., 1962). In a T-group this orientation is rejected by the "leader-trainer" forcing the group to establish for itself norms and procedures.

Whereas the other two methods of improving knowledge flow already mentioned concentrate on what goes on inside the organization, the sensitivity training group uses the on-going interactions of the people in the group as "data" to be analyzed by the group. To use this "here-and-now" data in a constructive fashion, the group first must build an atmosphere of mutual supportiveness and trust or what Schein and Bennis call, "psychological safety." Thus, besides the trainer being supportive and permissive, the group members must also develop openness and supportiveness toward one another. As members, to varying degrees undergo the transformation from the formal, status-loaded, impersonal, role-defined world to a climate of informality, trust and openness, and group "building," they are supposed to learn first-hand and spontaneously the value of full and open communication. The paradigm can be seen in terms of three steps: *unfreezing* old behaviors and attitudes, *learning* new behaviors and beliefs, and *freezing* the new behaviors and beliefs into the permanent repetoire of the participant.

The major problem with T-groups, as the reader may already have realized, is the transference of learning back to the organization setting (Bradford, et al., 1964). A free and open climate is the setting of the T-group; however, what is useful behavior in this type of climate may not be useful behavior in the organization. Although Davis (1967) and Friedlander (1968) have made some important strides in overcoming the barriers to application of T-group training in the organization, the main limitations of this training have still to be overcome. Nevertheless, insights about self, others, group processes, and organization characteristics are certainly of value, in general. This is especially true for purposes of facilitating knowledge flow since the implicit goal of many T-groups is improved communication (Bennis & Shepard, 19 ; Miles, in Bennis, et al., 1962).

3. Shared perceptions

Intergroup knowledge flow can also be facilitated by giving salience to superordinate goals which the subunits will perceive as shared or by the discovery of a common enemy (Blake & Mouton, 1964; Schein, 1965).

For example, the discovery of a common enemy leads subunits to overcome their barriers and reconcile their differences in order to face the new aggressor. For example, teachers may become unified in the face of an oppressive, tyrannical assistant principal; players on a football team can overlook their differences when playing an all-star game against another league; differences between purchasing and production divisions of the industrial organization are suppressed when the organization must vigorously compete against another organization in its field. Regrettably, however, such superordinate goals may only represent a temporary shift of conflict to a different level; once the common enemy is disposed of, the old barriers to knowledge flow and collaboration will probably return (Balke & Mouton, 1964; Schein, 1965).

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*For a closer scrutiny of the T-group and its questioned utility for organizations see two recent articles: House (1967 and Campbell and Dunnette (1968).

The discovery of a superordinate goal of two groups usually does result in weakening information flow barriers and greater cooperation. The goal itself can be a new task which requires collaboration of the subunits, or it can be a goal the groups had in common which previously had been overlooked. Even if groups do not actively work together toward a common goal, the acknowledgement of a shared goal will increase the openness and remove some of the defensiveness between parties (Mann, 1967).

The appeal to a superordinate goal is used by Blake and Mouton in their strategies to improve communication and cooperation and with some success (Blake & Mouton, 1962, 1964). However, they mention that once task goal attainment occurs, the heightened knowledge flow may be cast aside for the rekindling of competition. If the task is to deal with and overcome the intergroup barriers, this, of course, is less likely to occur.

4. Participation

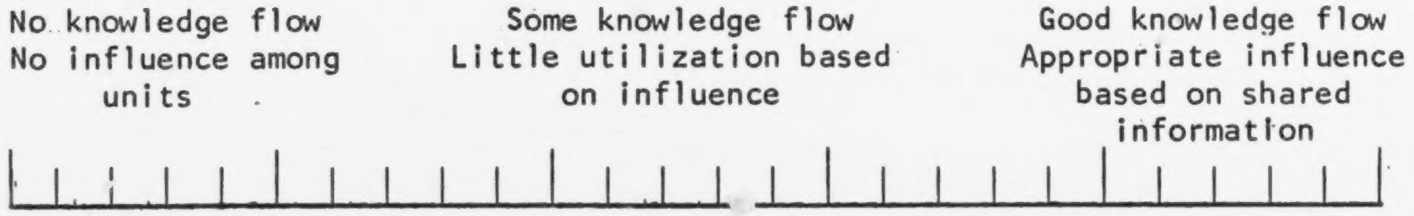
One of the best ways to overcome intraorganization barriers to knowledge flow is to routinely convene groups of organization members to discuss relevant issues. Guest (1962) calls this "institutionalized interaction." Interaction, if a normal procedure throughout the organization, can work toward effectively mitigating poor vertical and lateral knowledge flow. However, interaction, by itself, is not enough to do the whole job; it must be accompanied by a genuine sharing of influence, so that information not only flows but is used.

The term "participation" has been used often and abused almost as often. (Miles (1965) and Mann and Neff (1961) provide some of the meanings.) We see "participation" as the confluence of two processes essential to the internal functioning of the organization--*communication* and *influence*. One theorist has, in fact, constructed a thorough, empircally-based model centering on these processes. He calls this model for organization functioning an "interaction-influence" model (Likert, 1961, 1967).

As Likert (1961) conceives it, participation is not an all-or-none phenomenon. Rather, it constitutes a range of activities. On one side of the range is *no information sharing* and accordingly, no influence between the parties involved. Somewhere near the middle of the participation continuum might be the point of a fair amount of knowledge flow but with little effect. At the other end of the scale is *full knowledge sharing* *with appropriate influence* exercised by all relevant parties. Figure 4 charts this continuum.

Figure 4

CONTINUUM OF PROCESSES CONSTITUTING PARTICIPATION


No knowledge flow
No influence among units
Some knowledge flow
Little utilization based on influence
Good knowledge flow
Appropriate influence based on shared information

Techniques for increasing participation in the organization are oriented either toward augmenting knowledge flow: 1) upward and downward, or 2) between and within groups. We will now consider specific participatory techniques.

a. Upward and downward flow facilitation -- Group methods for stimulating participation are excellent means to facilitate knowledge flow both up and down the organization hierarchy. Group methods range from using group meetings for information transmission to delegation of decision-making responsibility to the group. Participatory group methods involve activities nearer the latter.

The group meeting where problems are surfaced, discussed, and all group members are encouraged to participate is the primary group method of overcoming barriers to knowledge flow among vertically divided units * (Habbe, 1952; Likert, 1961). To be fully effective supervisors who utilize group meetings to enhance information dissemination and utilization should "display an interest in the ideas of their subordinates and make use of these ideas" (Likert, 1961). This in essence calls for supportive behavior from the leader.

Group loyalty can be positively affected by a superior who uses group methods. If group methods are employed constructively, loyalty not only to the group but also to the organization is enhanced. Thus, cohesive subunits, developed and supported by group methods, will not only facilitate information flow but will also maintain superior task performance (Likert, 1961; Seashore, 1954).

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*As cited earlier in the extended example at the end of Part II, this is also an effective way of facilitating intragroup flow, although the primary emphasis of Habbe and Likert is vertical flow.

Participatory group methods engendering group loyalty and knowledge flow have been shown to improve cooperation (Morse & Reimer, 1956; Katz, et al., 1950), lower absenteeism (Mann & Baumgartel, 1953), and improve attitudes toward the organization (Likert, 1961). In conclusion, participatory group methods have the potential to do much more than just overcome knowledge flow barriers.

b. Intergroup knowledge flow facilitation -- The methods enumerated here are also participatory group methods in a sense; however, they typically do not include all the group members of the units involved. The prime objective in augmenting intergroup flow is to *overlap groups* (Likert, 1961). However, some other useful techniques of overlapping groups stem from Allen (1966) and Lorsch and Lawrence (1965).

The overlapping group idea should be apparent in the discussion of survey feedback as a training tool. There are organization members who are subordinates at one level of the hierarchy but are superiors in the next lowest level. Thus, by virtue of this dual group membership of one person, two groups overlap. Overlapping groups can be constructed in several ways (see Figure 5). It is the individuals holding membership in two or more groups within the organization who fulfill the function of *linking* the groups for knowledge flow. These members can be called "link pins." Thus, whenever the knowledge of one unit is relevant to the other, a person is available to disseminate the needed information. This is pictured in Figure 5a and b.

Another variation of overlapping groups is *teams* which perform tasks requiring knowledge input from different units in the organization. A team is composed of members of the different units that would be involved in consumating the overall task. These are project units which after accomplishing their primary task, return to their regular units. Lorsch and Lawrence (1965) present this as an important way to improve collaboration. They also point out that such teams must be composed of members low enough in the organization to have detailed knowledge bearing on the project.

Figure 5

VERTICAL AND HORIZONTAL OVERLAPPING GROUPS

a. *Vertical*: Superior-subordinate co-membership

0

0 0

0 0 0 0 0 0 0

0 0 0 0

b. *Horizontal*: Peer co-membership

0 0 0

0 0 0 0 0 0 0 0 0

c. *Horizontal*: Coordinating committees; ad hoc task forces

0 0 0

0 0 0 0 0 0 0 0 0

Members of subunits can be drawn into a new group for the purpose of *coordination*, as well as for project teams. A team established to serve as a coordinator unit for several task units stimulates knowledge flow by gathering form each functional unit representatives who can receive and transmit information to representatives of other functional units. Lorsch and Lawrence (1965) point out that such a unit is most effective when its members have a balanced point of view which enables them to work effectively with each of the specialist groups. The coordinating unit and the project unit are represented in Figure 5c.

Job rotation is another way to facilitate information flow among subunits of the organization (Allen, 1966; Guest, 1962). Rotation is useful mainly where totally different technical knowledge and skills characterize different subunits. Rotation of members among subunits facilitates an awareness and understanding of the problems facing other departments. Then, if knowledge from other departments is relevant, it can be provided by the man who is "on rotation." Allen also mentions that a policy of job rotation does not carry with it the implied status differential of "consulting" which tends to impede message exchange.

Two other ways of increasing participation, less formal than the others, are *intergroup luncheons* and *seminars* (Allen, 1966). In both there can be planned discussion of a topic of mutual concern or one group might want to present an idea to other groups. Again the implicit status discrepancy between a person seeking help and the "consultant" is avoided while intergroup information flow is enhanced.

5. Link pin specialist

Bennis (1966), forecasting the organization of the future, offers the vision of the specialist in the organization whose sole purpose is to facilitate knowledge flow from one subunit to another. The structure Bennis predicts will differentiate organization members not by rank and role but according to skill and professional training. (Interestingly, Burns and Stalker (1961)aalso discuss the role of the link pin specialist but they favor methods that are quite similar to the participatory group methods and project teams already discussed here.)

6. Structure

We can extend the idea of overlapping groups and dual memberships to the point where the organizational structure is changed. This provides several additional ways to facilitate communication among groups.

One researcher states that: "occupational difference is accompanied by a variation in knowledge, which results in a discrepancy in respect, which, in turn, influences the complementation of new information" (Price, 1964, p. 230). He goes on to suggest that where there are two groups in the organization that do not get along, another group should be added which is mutually appealing to both. His case study involved the lack of knowledge exchange between scientists and blue collar workers in an organization. Since both groups felt some similarity to applied scientists due to job overlap, Price proposed giving applied scientists and blue-collar workers and serving to relay information back and forth. This method of changing the knowledge flow network is probably most useful in organizations where an in-between group exists and other groups have good communication channels to and from the marginal group.

Another way the structure can be modified to facilitate knowledge flow is to increase the average span of control. For example, Washington High School has six assistant principals, each responsible for one functional area of the school. If, instead of the six assistant principals, there were three, each responsible for two functional units, their span of control has increased. The number of immediate subordinates they have gained yields the increment in their control span. Besides giving an administrator more people to supervise, an enlarged control span offers the subordinates many more sources of information within their own group. An example of such a restructuring with favorable results is reported by Worthy (1950) of the Sears, Roebuck organization. (This method removes intergroup barriers by collapsing the groups. Whether it destroys the barriers or makes them intragroup obstacles is an interesting question and one that remains to be researched.)

Another potential effect of increasing the average control span is to reduce the number of organization levels. Reducing the height of the organization would occur if enough supervisors at a level are removed so in turn their coordinators, at the next highest level are not needed.

7. Decentralization

When authority to make decisions is delegated down the hierarchy, decentralization occurs. Decentralization typically brings with it improved communication and knowledge flow in order to effectively handle the new responsibility that the decentralized unit has received. Hence, it would appear that decentralization is a simple procedure for increasing lateral and vertical knowledge dissemination and utilization in specific units of the organization.

In actuality it is not that simple. The recent disturbances (1968) in New York City's school experiment in decentralizing authority to a local group is an illustrative case. Before autonomy through decentralization is granted there should be some compatibility between the norms and goals of the decentralized unit and the parent organization.

There are several supporters of decentralization. Pelz (1966) mentions that innovation is prompted by a decentralized atmosphere. His data come from scientists in organizations but are transferable to other organization members. Griffiths (1964) supports decentralization in school systems; Beckhard (1967), Schon (1967), and Worthy (1950) defend decentralization in the industrial organization.

To elaborate, Schon, recognizing that the organization must find ways to facilitate internal knowledge flow, mentions that many organizations decentralize or, in his words, form

> a corporate umbrella for the formation of new small firms based on new technology. The larger firm attempts to identify ideas which promise new businesses where these are apart from the main business of the firm. It seeks men who are willing to be identified with such ideas to carry them forward, with relative autonomy, as new businesses. These will operate as independent profit centers within the larger firms (1967, p. 120).

One final point should be made. Unless decentralization is accompanied by *participation* and group decision-making at the appropriate level, the disadvantages of a centralized organization may merely be shifted lower in the organization. However, with participatory group methods, decentralization can be utilized to best advantage through higher quality decisions and greater motivation to implement them (Maier, 1955).

8. Geographical arrangements

Morton (1964) suggests that not only organizational but spatial changes be used to facilitate communication where desired. Thus, physical distance becomes a mechanism to impede or increase communication between groups. Morton specifically discusses the utility of locating certain organizationally separated departments together in a building to facilitate knowledge flow. Morton also mentions that the question of location of groups can apply to groups together on one floor, in the same building or in adjacent or nearby buildings.

Burns and Stalker (1961) also suggest that location can have a large impact on the amount of information flow to and from the group; Davis (1953) gives resounding support to this position with empirical data from an industrial plant. He found that the group possessing the least information was physically furthest away from the center of the organization.

9. Sociotechnical systems

Another approach described by Rice (1958), Marrow, et al. (1967, A. Frohman (1969), and Trist, et al. (1951) uses changes in technology as well as in the social system of the organization. These authors contend that the structure of the work flow in conjunction with the social groupings of organization members has an effect on behavior, knowledge flow, and on task accomplishment. This approach which considers the technology and social system together has been described as *sociotechnical.*

If organizational activity is viewed as a function of the interaction of two major factors, the technology and the organization member, then, in planning or changing one factor, the implications and repercussions on the other must be considered. For example, in weaving mills (Rice, 1963) and in coal mines (Trist & Bamforth, 1951) advances in technology met with lowered productivity. The reason was that the stable and satisfying social systems had been destroyed by the work flow changes. When the researchers modified the technical system by putting groups in charge of several machines rather than one man to one task, performance increased and absenteeism decreased.

To bring the discussion a bit closer to information flow, several researchers have pointed out that organization members typically do have the knowledge and ability to be responsible for--not just perform--their tasks. What is missing is giving them the responsibility. Moreover since there are frequently several ways work flow can be organized, the issue becomes one of choosing the best system so that both technical and social requirements are met. The solution seems to be the *autonomous work group* where a group of members share responsibility and knowledge for undertaking a meaningful part of the "organizational mission" and can construct their own social system at the same time (Rice, 1958; Trist & Bamforth, 1951; Trist, Higgin, Murray & Pollack, 1963; Marrow, et al., 1967; Bucklow, 1963; McGregor, 1967).

10. Reward structure

The most potent means of governing human activity is to reward desired behavior. In line with this reasoning Allen (1966) suggests allocating rewards for intergroup knowledge dissemination and utilization to break down the barriers. Schein suggests that in a similar vein intergroup collaboration can be increased by "organization rewards given partly on the basis of help which groups give to each other" (1965, p. 85). Katz (1964) and Katz and Kahn (1966), delineating the effect of different rewards on member behavior in the organization, concur that in order to elicit certain behaviors, commensurate rewards must be given. Katz and Kahn discuss the relationship between member behavior and six types of incentive patterns: 1) organization and legal controls for compliance, 2) individual monetary rewards, 3) organization-wide rewards, 4) peer group approval, 5) provision for self-expression and skill utilization, and 6) provision for value expression and identification with organizational goals. However, they do not explicitly mention knowledge flow in their discussion.

C. Facilitating Knowledge Flow Out of the Organization

With respect to facilitatory mechanisms, the last type of information flow we have to consider is *output*. As the reader may recall from the discussion of barriers to knowledge exit, the scope of organizations considered was narrowed to those which have a purpose of disseminating knowledge rather than marketing it. Organizational goals and competition among organizations in the same or related industries were mentioned as prime reasons why, in general, knowledge diffusion from organizations did not occur. In this section we will review several mechanisms which aid a disseminating organization in transmitting new knowledge.

1. Increasing linkages

Probably the most obvious way of conveying information to more organizations is to be in contact with more organizations. Moreover to enhance the probability of gaining acceptance and utilization of the information, greater linkage to any one organization is helpful, i.e., increased diversity of contacts (Menzel, 1966; Lippitt, et al., 1958).

To enhance the variety of connections to an organization several methods are available. One, covered in detail earlier, is the dissemination of information to a *group* of organizational members rather than to just one person, e.g., the chief administrator.

2. Status

The facilitating effect of high status of the disseminator is, in part, contingent on the flexibility of the resource in adapting the knowledge to the culture of the user. If they are employing similar coding schemes, etc. then the status of the resource can be a force facilitating knowledge transfer.

One example of the effect of status on knowledge diffusion is afforded by the Physical Science Study Committee. Clark (1965) reports one of the reasons for the acceptance and implementation of its recommendations was the prestige of the committe which worked long and hard to set up the new materials. Moreover, its high status was generated both by the composition of the committee and the prestige of its supporting mechanism, the National Science Foundation. The result, Clark relates, was usage of the new materials proffered by PSSC by 40-50% of all high school students taking physics within five years.

SUMMARY

In this paper we have taken a close look at the features of an organization in order to understand it and the way it affects information flow. The basic premise is that a typical organization fosters two opposing conditions: a condition of stability and orderliness in order to protect its functioning and internal relationships; and a condition stimulating creativity and innovation in order to keep up with the myriad of changes that affect it. Furthermore, knowledge and information flow can be on the one hand inhibited by organizational features that preserve the status quo and, on the other hand, facilitated by the methods that encourage innovation.

The flow of information can be divided into three parts: input, throughput, and output. This general framework is quite consistent with the open systems approach and allows us to look at the impact of the organization on information transmission in three "natural" stages of flow.

Most organizations are admirably constructed to maintain orderly activity and relationships within them. The division of labor, system of role definitions, compensation system, training programs, and structure and leadership patterns are common to many organizations and all can serve as barriers to information flow or, if used appropriately, as facilitators.

The flow of communication into an organization may be impeded by different status levels and coding schemes between organizations and rigid social relationships, lack of openness to outsiders, local pride, anticipatory personal threat, poor training strategy, and the economic situation in an organization.

On the other side, knowledge input may be improved by appeal to profit, chief administrator changes, administrative decree, crisis perception, examination of other organizations, good training techniques, usage of external agent, invasion from outside, increased inclusion of outsiders, development of knowledge seeking subunits, and enhanced professionalism.

Information transmission out of the organization depends to a very large extent on the goals of the organization. If an organizational goal does not specify the output of information from the organization (extension units or universities to specify it), then competition will preclude knowledge output. For organizations in which this is not the case, linkage, adaptive transmission, and status affect the facility of information flow.

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